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A service publication of
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teaching the life sciences from elementary grades through college

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Vol. 15, No. 2

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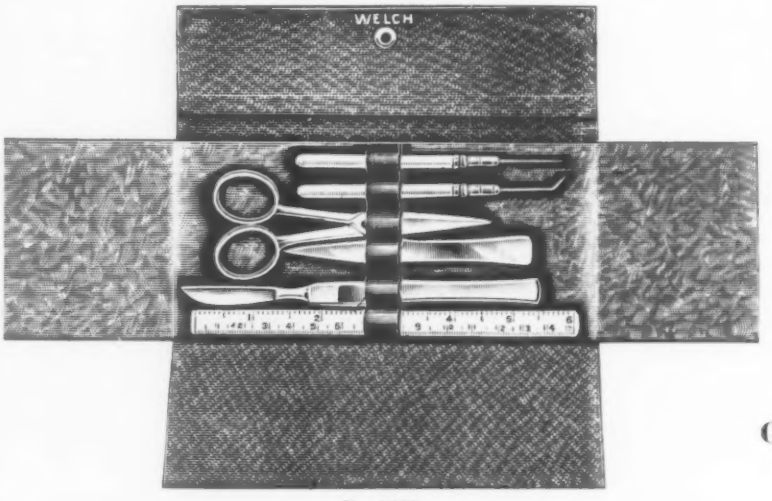

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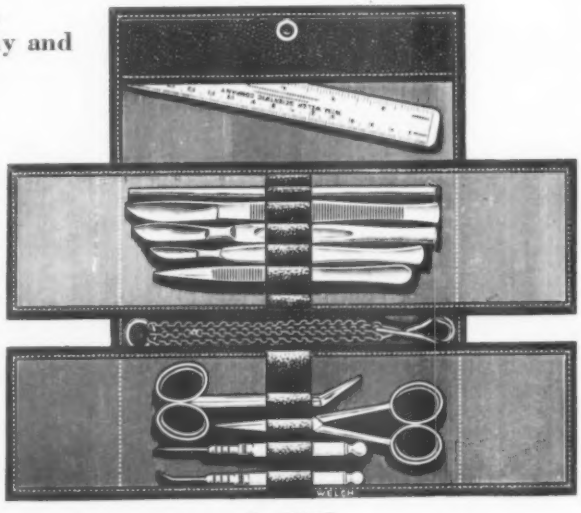

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Articles are scheduled for publication in approximately the order of acceptance of the manuscripts. Generally the journal is tentatively arranged about three or four issues ahead, and there are under consideration at any time enough manuscripts for about two or three more issues. Some space is of course allowed for news items and articles of a seasonal nature. Many seasonal papers have to be postponed an entire year, simply because the author has not allowed the necessary four to six months that intervenes between acceptance and publication.

For details concerning titling, headings, references, illustration, etc., consult *Preparation of Manuscripts for Publication*, which appeared in the November, 1949, issue of THE AMERICAN BIOLOGY TEACHER. A limited number of reprints is available; copies may be obtained from the editor or from the Secretary-Treasurer.

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THE COVER PICTURE

An Old New England Farm was taken by Donald S. Lacroix of Amherst High School, Amherst, Massachusetts, on Verichrome film, using a 9×12 cm Voigtlander camera equipped with a yellow filter.

The American Biology Teacher

Vol. 15 FEBRUARY, 1953 No. 2

More Activities by the Pupils

of

S. M. PATTEE

Roosevelt High School, Cedar Rapids, Iowa

How Fast Do Trees Grow?

Thirty years ago 23 American Elm trees were transplanted to the parking around our school. This spring a classmate and I measured their diameter breast high. The smallest was 15.5 inches and the largest was 28.75 inches. The average was 20.95 inches. If the trees averaged .95 inches when they were set out, they have made an average growth of two-thirds of an inch per year. They were set out between the sidewalk and the street pavement.

The photograph shows how the caliper is made and used. One end folds and one end slides off so that it may be carried easily. The diameter is read in inches on the long bar.

John King

Use of the Gravity Protractor

Many thousands of tons of soil are lost annually through carelessness by the farmer and people in the city. This is undesirable and can be prevented in a number of ways.

One way this can be prevented is by teaching farmers what land can be cultivated successfully and what land will be of little value after a few years of hard farming. In using this method a farmer would realize that land of 27 per cent slope cannot be cultivated because the rich top soil and water would soon wash right down the hillside. On land of such a slope only trees will hold the water and top soil. The farmer will then ask how he can find the slope of the hillside. One of the most successful and cheapest ways is by using a

gravity protractor. Our instrument measures the slope of the hill in degrees and not in per cent. Degrees can easily be changed to per cent by multiplying by two and one-fifth.

The method used to find the slope of the hill is simple. The person will need for materials the gravity protractor and another person or a stake with his eye level marked on it. The person with the gravity protractor stands at the top of the hill to be measured and sights along the edge of the protractor to a spot on the helper's body and at his eye level. The arm of the protractor is left swinging until it stops on one number. The protractor is then read and this number is multiplied by two and one-fifth. This gives the per cent of slope on the hillside.

Usually land that slopes less than six per cent can be farmed indefinitely if the owner uses a good rotation of crops including a legume. Fields that have slopes of seven to eleven per cent will hold the soil and the water if strip cropping is practiced along with a good rotation. If land slopes from 12 to 17 per cent contour plowing and rotations have proved successful. On land of 17 to 21 per cent slope, terracing and a rotation have held the soil and much of the water. If land slopes 22 to 27 per cent it should be used permanently for pasture land. If the slope is more than 27 per cent only timber will hold the water and soil.

Around our school we found slopes of 33 per cent, 19 per cent and 25 per cent. Through proper farming of the respective slopes, a farmer interested in saving his soil can save most of his top soil and water and make proper use of both.

JIM CAVINESS

BILTMORE CRUISER STICK

A Biltmore cruiser stick is easy to construct and is useful to anyone buying, selling or measuring timber. It is used to determine the approximate number of board feet in a tree or log.

I used a light colored piece of lumber $1 \times \frac{1}{2} \times 36$ inches to make such a stick giving the number of board feet in 1, $1\frac{1}{2}$, or 2 sixteen-foot logs in a standing tree. I also used a set of number and letter punches and an ink pad to place the numbers on the stick.

I first needed to prepare the stick to measure the number of sixteen-foot logs in a standing tree; that is, to make a Merritt Hypsometer Scale. To do this I held one arm in front of me level with my eye and had someone measure the distance from my eye to the perpendicular stick. I used the following equation to determine the length of a sixteen-foot log as it would be seen on my stick:

$$\frac{x}{\text{Length—eye to hand}} = \frac{16' \text{ log}}{66' \text{ distance to tree}}$$

The distance from my eye to the stick was 21 inches, so X equalled 5.1 inches for me. I then marked off the 5.1 inch units on the stick to measure the sixteen-foot logs.

Then I copied a scale out of the U.S.D.A. yearbook for 1949 (page 851). I stamped the numbers on the stick so that I could read the number of board feet of lumber in most any tree.

To use the cruiser stick, I first determined the diameter of the tree breast high. Then I paced off a horizontal distance of 66 feet. Standing at this spot, I held the stick 21 inches

from my eye with the zero end of the stick down and level with a spot one foot from the base of the tree, where the tree will be cut. Without moving my head, I sighted to the point on the tree trunk where the top of the last usable log would be. I noted where this line of sight intercepted the stick. The marks on the stick indicate the number of sixteen-foot logs in the tree.

Then I turned the stick in my hand and read the number of board feet which there are in the logs of each tree.

JAMES STEWART

TO APPEAR IN THE NEXT FEW ISSUES:

Participative Visual Aids . . . Damsel Fly Larvae for the Study of Insects . . . The Ecology of Conservation . . . Education for Family Living . . . Educational Activities of The National Wildlife Federation . . . Flightless Birds of New Zealand . . . Conservation Camp . . . Study Nature by Ear . . . The "Air Fern" . . .

A Guide for Teaching the Scientific Method

LINCOLN PETTIT, Hiram College, Hiram, Ohio

While it is true that a thorough understanding of the methods used in the advancement of science comes only after years of study, there are many advantages in presenting students with a series of steps in the initial weeks of their science course.

A great many capable teachers accomplish their task of inculcating the scientific attitude and the scientific approach through excellent example by their classroom and laboratory procedures, and indeed by their daily living and their conduct in administrative and community affairs. It is unfortunate, however, that their students ofttimes are not observant enough to perceive exactly what it is that creates the attitude and approach which we have come to associate with scientists and teachers of science subjects. This may be somewhat akin to our frequent realization that the basic reason we like a friend escapes us when we try to put it into words; only after mature reflection do we settle upon the parts of their personality we like.

It is my belief that students advance much more rapidly toward adopting a scientific attitude, if they have at the very outset a "blueprint" of the general way scientists go about their business. A great deal of good is done for them by presenting the scientific method as a series of steps at first. Later in the course of study it may be pointed out that scientists often combine some steps into one, or arrive at their conclusions sometimes by accident.

I speak of this guide as a "blueprint" advisedly. It is given here as a teaching and training device. As in construction, the blueprint may, by intelligent coöperation between contractor and his employer, be altered somewhat to suit unforeseen circumstances, but at the beginning the blueprint serves a very useful purpose. Beginning students are gratified to have a series of steps to learn; they find that the problems of their daily lives lend themselves quite well to analysis by this method. I have found them quick to per-

ceive, too, that mental "short-cuts" are possible, but that close inspection reveals the steps actually *were* taken, although they may not have been aware of them.

The Puzzling Situation

Step One in the series is easiest to explain: a person becomes aware of a puzzling situation. Technically, this may be termed an "indeterminate situation." Something is not in keeping with the ordinary train of events. A very simple example is seeing that a tire has gone flat. All scientific work begins with puzzling situations. Sometimes in daily life the puzzling situation is created by obstacles to personal wishes, such as the wish to play ball being obstructed by the demands of homework. A problem like this may be fraught with emotion and prejudice, indeed! But by cool analysis, one can take definite lines of thought to reach a sensible conclusion.

The first step is *realizing that a problem exists.*

Stating the Problem

Imbued by curiosity, the scientifically minded person at once seeks to make the problem clear-cut and definite. He now removes it from the realm of vague realization and puts a fence around it, so he can look at it closely. By stating the problem clearly, the individual can come to grips with it. In the simple example we shall follow, the statement of the problem is, "What has caused the tire to go flat?" In more complex situations, stating the problem is not so easy, but it is a necessary step. One might state an advanced problem something like this: "How can cancer be cured?" or "What causes cancerous tissue to develop?" On a more specific level, the problem may be stated thus: "How are some forms of cancer in mice transmitted to the young?"

If the problem is not stated clearly, the remaining steps may not produce much information. A poorly phrased question usually receives an indefinite answer. Put another way, the answer to a question can only be as good as the question itself. The humorous conundrum, "How long is a piece of string?" is a case in point. The statement of the problem requires a careful choice of words, a sharp boundary, and a direct attack upon the subject at hand.

Making a Good Guess

The third step is often called, "formulating a working hypothesis," but I have found many students frightened away by those expensive words. "Making a good guess" amounts to the same thing, and if we are to *lead* our disciples, we should choose the language they understand.

There may be many good guesses about that annoying flat tire: it may be punctured; the valve may be worn out; pranksters may have let the air out. In less simple problems, the good guess comes from a back-log of experience in the subject investigated. The specialist in cancer research may have combined his second and third steps when he stated *his* problem, above, by adding, "Are they transmitted through the milk or by contact before or after birth?"—three good guesses. A hypothesis is actually an assumption without proof. It rests upon past experience. It is drawn sometimes as a parallel guess which the individual remembers from another problem. One may rapidly write off a number of guesses at once, because experience makes them seem improbable or unlikely; the possibility that pranksters let the air out of one's tire would be less likely to make sense in a locked garage, for example, but in an extreme case, such a guess *might* be correct, particularly if one should notice also that the garage window was open, and unfamiliar footprints were seen on the floor.

We call the hypothesis we select to follow through, the "working hypothesis." It may be discarded presently, and another "working hypothesis" may be chosen to follow through. It serves as a stepping stone to the next level.

Setting up a Controlled Experiment

In the simple example, we probably select the hypothesis of a faulty valve. We may wet the end of the valve stem after adding some air; if no bubble is formed, we "throw out" that hypothesis. We proceed to the next "working hypothesis" at once. In setting up

the experiment for the next hypothesis (a possible puncture) we find the task more difficult than the easy experiment we used to test the valve. We remove the inner tube, or have it done for us, and see whether the inflated tube bubbles in a tub of water. Devising the experiment in the case of the cancerous young mice may require much thought and careful planning. Considerable thought is given to the time available, the work done by other scientists as found in scientific literature, the cost, and the records we may have on the cases of cancer among animals to be tested.

The "control" is a device used to assure the worker that the results he will later obtain are due to his experimental tests and not to outside factors. In other words, he guards himself against drawing a false conclusion by rearing litter mates under normal or usual conditions, while the brother or sister mice (several of each sex) are being used as test animals. In agriculture, a portion of a crop is "left alone," while other portions are sprayed or fertilized in various ways. The results are compared with the "control," which has been left untreated.

Gathering the Evidence

Our humble tire bubbles, and that's the evidence of a puncture, of course. If we are assembling evidence about the wisdom of doing homework *versus* playing ball, we quickly line up in our minds the whole array of our marks, the time we have later in the evening, our real need for exercise, and the length of the assignment. To do this unemotionally and without a *little* prejudice in favor of playing ball may be very difficult! But this points to an important feature of the scientific method. The scientist takes the evidence as nature gives it to him. He leaves himself out. His wishes—that he might overlook non-cancerous mice, or that some may live so he can prove his point—these he pushes aside. The investigator is looking for *truth*, and he gets his glory from being true to his code: include *all* the evidence, whether it "goes" the way he previously expected or not.

The evidence comes usually as "raw data" These data are often temperatures, heights of plants, production in bushels, numbers of living or dead mice, and the like. It may take a few minutes, or it may take months or years to gather these data, but gather them he must, before the scientist can proceed in all honesty to Step Six.

Transforming the Evidence into a Meaningful Statement

With the data before us, we can make a statement having meaning. One bubble from our tire allows us to state, "The tire was flat because the tube has a puncture," or simply, "It's a hole." The meaningful statement is a little harder in some other cases. The cancer specialist may have conflicting evidence. *Some* of his mice, having been weaned early, or dropper-fed with special milk, or nursed by another, non-cancerous mother, may develop cancer, but not so many as did when nursed by their cancerous mother. What does he do? Can he make any sense of the results? Any meaningful statement? Certainly, he can. But he must be cautious and conservative. He must take into account *all* the evidence. His meaningful statement is given, perhaps, in the percentages of each group developing cancer.

This step is one of "boiling down" the evidence in one or a few sentences which correctly reflect all the data.

A housewife I know wanted to find out which of two places was the best one to keep her pots and pans. She gathered her data by measuring the distances and counting the trips she made to the sink and stove, and in other ways assembled a lot of information (Step Five). When she made the meaningful statement, it read like this: "I walk an average of 40 yards a day when they are kept here, and an average of 53 yards a day when I keep them there."

In many cases we may proceed rapidly to Step Seven; however, it is not always so easy, and students in science courses may at this point be ready for an example or two illustrating the indecisive results which often "crop up." One sees now and then a bit of published research which serves a good purpose as a *report of progress*, with a concluding

statement, " . . . some progress has been made, but further investigation is being carried out . . . . " The author wisely refrains from going beyond the evidence at hand, but he is often able to assemble the data known to him, and offer a statement, *not* conclusive, perhaps, but *suggestive*. He offers his statement as a true picture of the evidence. This step is not to be confused with the next step.

The Warranted Assertion, or "Conclusion"

When the evidence is clearly "for" or "against" the working hypothesis, a conclusion is drawn. If "against," one starts again at Step Three with another "working hypothesis." (At least we have some "negative" information. It *may* be of general value for a scientist to publish negative results, to save the time being spent by others, who may be working on the same research problem.)

The conclusion should never extend beyond the evidence. It is always "leaning over backwards" to be conservative. The conclusion is in strict agreement with the data and the meaningful statement. The housewife reaches her conclusion rather easily. Of *course* she will keep her utensils where their use demands less walking! Of *course* we can jump to the conclusion that the hole in the tire was made by a sharp object. But in advanced studies, the conclusions come with effort, sometimes requiring careful mathematical expression, statistical tests or cautious conservatism. The good scientist resists the impulse to "jump to conclusions" until he has studied his assertion with a critical eye. His reputation rests upon being accurate and within bounds in his conclusions.

You can "spot" the propagandist who distorts the truth when he is forced to modify his conclusion upon cross-questioning. He is bound by no scientist's code. Much advertising stretches the evidence a little, or soft-pedals the unfavorable side. Fortunately, most people can detect fraud in propaganda and advertising, and I believe that training in a science, with emphasis on the steps given in this guide, will help a great deal in developing everywhere the healthy criticism we should focus upon broad, sweeping conclusions.

Most problems, the scientist has learned, are not completely and easily solved. Honest conclusions very frequently are full of "ifs" and "buts." Very few findings are clear-cut. Even the housewife may have to consider the kind of cooking she did during the week or two she kept records—Were the meals of the usual content? Did she sometimes carry several pans at a time from one place and single pans only from the other? Caution in stating the conclusion is of paramount importance to the scientist.

Publishing the Results

The eighth and final step is used almost exclusively by scientists. A carefully written account of the experiment, from beginning to end, is submitted to the editor of a learned journal. (There are about two thousand journals in all languages being published regularly.) The scientist sends his manuscript to the journal specializing in his subject, and it is often sent only after being presented for comment before a gathering of brother scientists. Upon publication, the new knowledge joins the vast body of existing information, where others may learn from it. Some fellow scientists in another part of the country or in a foreign land may read the "paper" telling of the new knowledge, and be stimulated to repeat the experiment, or go beyond it with more investigations. The new knowledge gives rise to new puzzling questions, new statements of new problems. In this way the expanding, growing and changing nature of reality is uncovered.

Application of the Guide

As I have suggested at the start, we cannot give our students these eight steps as a blueprint and expect them to understand the scientific method fully in a short time.

Classroom procedures built around these eight steps can extend the scientific method week after week. I have aroused interest by suggesting that students submit a specific example of the scientific method *as they have applied it* to some every-day problem. This produces "raw material" for individual discussions. At every opportunity in the classroom, the teacher refers to particular steps,

asking for more evidence, cautioning about conclusions hastily arrived at, or expressed without inspecting the meaningful statement.

On more than one occasion I have said in all sincerity that we are in the middle of a great period of change in our thinking habits, and almost before our eyes we are "graduating" into a society which places a high premium on solving problems in a scientific way. It need hardly be said that the scientific method has limitations in our emotional lives, but I maintain that our students, whether they expect to go on in science or not, will have to adjust their mental habits so that they are prepared to apply the scientific method wherever possible—even in the difficult area of personal problems. I suggest that, in a discussion after class sometime, you propose the problem of choosing a life partner by using the scientific method in self-analysis!

Free and Inexpensive Materials for Conservation Education*

MURIEL BEUSCHLEIN

Chicago Teachers College, Chicago, Illinois; Member of Executive Committee of Conservation Project of The National Association of Biology Teachers

The National Committee of the Conservation Project of THE NATIONAL ASSOCIATION OF BIOLOGY TEACHERS has recognized the need for making current bibliographies of materials pertinent to conservation available to those engaged in educational work.

Past experience has proved the great value which teachers derive from having a ready reference of free and inexpensive materials that may be obtained as supplementary aids to classroom instruction. The following list from state and federal agencies, universities, business, and industry has been compiled as a contribution toward filling this need. The reader will also find listed many bibliographies of various types and for many levels of teaching.

In most cases it has not been possible to evaluate each item carefully before including it in the list. The use of the items of the material and their relative value is left to the judgment of the teacher or administrator. The adaptability of the items will vary considerably as it will be determined by the location, the specific community and student needs. Some state departments have developed comprehensive programs and have prepared teaching guides and student material. It is recommended that the teachers investigate the availability of these materials from state departments of conservation, education, fish and game, and forestry, the extension departments of universities, and the regional offices of the U.S. agencies. These sources provide free material which are adapted for use in a specific region. In some instances such materials have been listed but the sources have not been exhausted. In planning for future revisions, it would be helpful to the author to have appraisals of specific items by teachers who are willing to report them.

In instances where a large quantity of material is available from a particular source, only a few items are mentioned due to the lack of space. The notation, " List of publications is available," indicates that other items can be secured. Where no price follows mention of the item, the material is available free on request to schools.

No list of this type can be comprehensive as demands upon material cause it to go out of print and there is a constant supply of new material becoming available. While some sources of free films and bibliographies of films have been included, no particular effort has been made to include all that are obtainable. This may suggest a future project.

The process of compiling this list has brought an awareness of the inadequate supply of available materials concerning a num-

*This article is a contribution of the NABT Conservation Project. A limited number of reprints are available at low cost from the Project Leader, Dr. Richard L. Weaver, P.O. Box 2073, Ann Arbor, Mich.

ber of topics related to conservation. The author would appreciate hearing from teachers regarding types of materials for which they feel a need and which they are unable to find. It may be possible to stimulate the production of suitable materials to fill such needs.

Sincere appreciation is extended to all individuals, organizations, and corporations that have cooperated in the compilation of this list.

Advertising Council, Public Policy Committee, 11 West 45th St., New York, N. Y.
The Miracle of America, 19 p.

Allis-Chalmers, P.O. Box 512, Milwaukee 1, Wisconsin.
Down the River, 12 p.
Making Paydirt Last, 15 p.

Alabama

Alabama Polytechnic Institute, Agricultural Experiment Station, Auburn, Alabama.
#90 *Food Crops for Game Birds on Farm Lands*, 8 p.
#92 *Christmas Tree Production*, 18 p.
#95 *Construction of Farm Fish Ponds*, 55 p.
#43 *Year Round Use of Land for Grazing Grade Steers in Tennessee Valley*, 7 p.

Alabama Polytechnic Institute, Resource-Use Education Workshop, Auburn, Alabama.
Pioneers of a New South—for junior high school use, $.30.
Better Land for Better Living—for senior high school, 27 p., $.30.

Alabama Dept. of Conservation, Administrative Division, Montgomery 4, Ala.
Will have material ready in 1953.

State Department of Education, Montgomery, Alabama.
Using Resources of the Community to Build a School Program, 118 p., $.50.

Alameda County Mosquito Abatement District, Court House, 12th and Fallon Sts., Oakland 7, California.
Mosquitoes Are Unnecessary—material on mosquito control, of local interest.

Aluminum Company of America, Educational Dept., 1501 Alcoa Bldg., Pittsburgh 19, Pennsylvania.
Material on the manufacture of aluminum and its uses, teachers' manual and booklet for class use.

American Association of Nurserymen, Public Information Service, 295 Madison Ave., New York 17, N. Y.
Ten Ways to Control the Climate Around Your Home, 6 p.
Plant America series, *Soil Conservation, Better Living, Community Betterment, Industrial Beautification*, 4 p. each.

American Ass'n. of School Administrators, 1201 16th St., N.W., Washington 6, D. C.
Conservation Education in American Schools, 527 p., $4.00.

American Council on Education, 1785 Massachusetts Ave., N.W., Washington, D. C.
Guide for Resource-Use Education Workshops, 50 p., $.50.
The Teacher, The Schools, The Community, $.25.

American Education Press, 400 S. Front Street, Columbus 15, Ohio.
Current Science and Aviation, classroom newspaper, $.35 a semester.

American Farm Bureau Research Ass'n., 300 Schurz Bldg., Lafayette, Indiana.
Some Soil Fertility Information—a reprint, 28 p.
Soil Bank Balance—a reprint, 6 p.
More Corn on Less Land, 6 p.

American Forest Products Industries, Inc., 1816 N Street, N.W., Washington, D. C.
Our Forests, Their Use and Conservation—a school bibliography, lists booklets, maps, charts, filmstrips, films and teacher's manual.

American Forestry Ass'n., 919 17th St., N.W., Washington 6, D. C.
Our Growing Water Problem.
How to Start a Young Forest, 4 p.
Suggestions for Integrating Forestry in the Modern Curriculum, 4 p.
Forest Fire—comic type booklet by Smoky.
Teaching Conservation by Ward P. Beard, 144 p., $1.50.
Trees Every Boy and Girl Should Know, $.50.
Trees of District of Columbia, $.35.

American National Cattlemen's Ass'n. Public Relations Committee, 515 Cooper Building, Denver 2, Colorado.
Roundup of Cattle Facts and Figures, 122 p.
You Can't Eat Grass.
Meat on the Nation's Table, 7 p.
Two films—"Land of Our Fathers" and "All Flesh Is Grass."

American Nature Ass'n., 1214 16th St., N.W., Washington 6, D. C.
Nature Magazine's Guide to Science Teaching by E. L. Palmer, 125 p., $.25.
Nature Magazine, $4.00 year.
Also nature reprints $.15 each. List available.

American Paper and Pulp Ass'n., 122 East 42nd St., New York 17, N. Y.
The Paper Industry.

American Plant Food Council Inc., 910 17th St., #817 Barr Building, Washington 6, D. C.
Our Land and It's Care, 65 p.
First in the Hearts of Farmers, a free loan film.

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, Ohio.
It's Your Top Soil, 18 p.
How Erosion Ruins the Soil.

American Tree Association, 1214 16th St., N.W., Washington 6, D. C.
Gabby and the Forest Fires, for elementary grades, $.10.
Two Trees—woodlot conservation, $.10.

American Viscose Corp., 350 5th Ave., New York 1, N. Y.
Science Creates a Modern Industry.
Man Made Miracle—4th–8th grade.
Teaching material for grades 1–3.

American Walnut Manufacturers Ass'n., 666 No. Lake Shore Drive, Chicago 11, Illinois.
Forgotten Acres, 37 p.

Appalachian Hardwood Manufacturers, 4141 Walnut St., Cincinnati, Ohio.
Lesson in Appalachian Forestry—grades 6–8, 46 p., $.10.

Arizona

Arizona Conservation Club, Inc., Box 758, Tempe, Arizona.
Natural Resources of Arizona—A Guide for Improved Teaching by B. Ira Judd, 170 p., $3.12.

Arizona Highway Department, Arizona Highways, Phoenix, Arizona.
Arizona Highways—a monthly publication, an attractive 44-page magazine with color photographs of the region.

Arkansas

University of Arkansas, Bulletin Office, College of

Agriculture, Fayetteville, Arkansas.
Curriculum Unit on Conservation of Natural Resources—a Guide Book for conservation education.
#486—*Gully Control.*
#513—*Soil Improvement Practices Affecting Fields of Cotton,* 89 p.
#495—*Method & Cost of Clearing Land,* 43 p.
#485—*Pasture Improvement for Arkansas Uplands.*
#380—*Influence of Rainfall, Cropping & Cultural Methods in Soil and Water Losses,* 48 p.

Armour and Company, Union Stock Yards, Chicago, Illinois.
Food map of the United States.

The Asphalt Institute, 801 Second Avenue, New York 17, N. Y.
The Role of Asphalt, 8 p.

Association for Supervision and Curriculum Development of N.E.A., 1201 16th St., N.W., Washington 6, D. C.
Large Was Our Bounty, 216 p., $2.50.

Audubon Junior Clubs, 1000 Fifth Avenue, New York, N. Y.
Nine Million Young Conservationists—a reprint, 4 p.
Material and information for club activities.

Belgian Government Information Center, 630 Fifth Ave., New York 20, N. Y.
A Ten-Year Plan for Economic and Social Development of the Belgian Congo by Pierre Wigny, 72 p., $.25.

Bituminous Coal Institute, Southern Building, Washington 5, D. C.
Map of Coal Areas of the United States.

Boy Scouts of America, 2 Park Avenue, New York 16, N. Y.
Conservation—Merit Badge Series, $.25.
Forestry—Merit Badge Series, $.25.
Soil and Water Conservation—Merit Badge Series, $.25.

British Information Services, 30 Rockefeller Plaza, New York 20, N. Y.
Agriculture Picture Set—"Battle Against Erosion."
Britain Speeds the Plow, 48 p.

California

Department of Fish and Game, Public Information Service, Sacramento, California.
Fish and Game Laws and Reasons for Them, 8 p.
Basic Deer Management.
Crop Damage by Wildlife, #5, 71 p.
Warm Water Game Fishes of California, 20 p.
Owls of California, 8 p.
List is available.

Dept. of Natural Resources, Conservation Education Section, Sacramento 14, California.
A suggested list of Audio-Visual Material on Conservation.
Camping and Outdoor Education in California, 49 p.
School Wildlife Leaflets—*The Sardine, The Ringneck Pheasant,* others.
List is available.

Dept. of Natural Resources, Dept. of Education, Sacramento 4, California.
A Curriculum Unit on Conservation of Natural Resources, limited.
Blister Dust, 10 p.
Dollars and Sense in Conservation, 40 p.
The Little Hillside—written by 6th grade class, 13 p.
Where Rivers Are Born, 64 p.
Conservation Within Secondary Science Courses, 16 p.
Guide Book for Conservation Education, 48 p.

California State Dept. of Education, Bureau of Textbooks and Publications, Sacramento 14, California.
Curriculum Unit on Conservation of Natural Resources, $.50.
Source Material for Conservation Week, $.15.

University of California, California Agricultural Experiment Station, The College of Agriculture, Berkeley, California.
Dollars and Sense in Conservation.
Irrigated Pastures in California, 58 p.

California Redwoods Ass'n., 405 Montgomery St., San Francisco, California.
Redwood Region Tree Farms.
California Redwood—Its Properties and Uses.
Films and other pamphlets. List is available.

Camp Fire Girls, Program Dept., 16 East 48th St., New York 17, N. Y.
Activities in Conservation and Nature Lore, 2 p.
Our Land: Activities for Camp Fire Girls, $.75.
Nature in Camp, mimeo., 14 p.
Fun with Science, mimeo., 2 p.
Others in process.

J. I. Case Co., 700 Case St., Racine, Wisconsin.
Water Spreading, 16 p.
Win Against Water, 16 p.
Build a Pond, 16 p.
More Food from Fewer Acres, 16 p.
Pageant of Progress, 16 p.
Land of Plenty, 62 p.
Catalog of free audio-visual aids.

Caterpillar Tractor Company, Peoria 8, Illinois.
Conservation Pays, 24 p.

Chamber of Commerce of the United States, Washington 6, D. C.
Schools Must Grow for Tomorrow, $.20.

Chamber of Commerce of the United States, Natural Resources Dept., 1516 H St., N.W., Washington 6, D. C.
Natural Resources Notes—a free publication.
Policy Declarations on Natural Resources, 1951, 35 p.
Our Vanishing Natural Resources—a Symposium, 1946, 39 p.
Our Renewal Resources Can Be Sustained—a Symposium, 1949, 31 p.

Chicago Natural History Museum, Roosevelt Road at Lake Shore Drive, Chicago 5, Illinois.
Museum Stories—many topics, $.01 each, *Arbor Day, Redwood Trees, Why Leaves Change Color.*
Natural Landscapes of the U. S., $.25.
List is available.

Chicago Teachers College, 6800 Stewart Ave., Chicago 21, Illinois.
Free and Inexpensive Teaching Material for the Science Teacher by Muriel Beuschlein and J. M. Sanders, 1953 edition. Send $.10 to cover cost of mailing.

Church and Dwight Co., Inc., 10 Cedar St., New York 5, N. Y.
Bird cards and chart.

Colorado

State of Colorado, Advertising and Publicity Dept., Capitol Bldg., Denver, Colorado.
Colorful Colorado.
Colorado—Top of the Nation.

Committee on Southern Regional Studies and Education, 830 E. Peach Tree St., N.E., Atlanta, Georgia.
Education Helps Build a Nation, 171 p.
Selected Bibliography for Resource-Use Education, 11 p.

Connecticut

Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven 4, Connecticut.

Bul. 194—*Manure From the Sea*, 13 p.
Bul. 523—*The Forest Soils of Connecticut*, 33 p.
Cir. 142—*Peat and Swamp Muck for Soil Improvement in Connecticut*, 10 p.

Connecticut Agricultural Experiment Station, Dept. of Soils, New Haven, Connecticut.
Our Soil—A Basic Natural Resource, mimeo., 7 p.
Soil Managements, Soil Sense and Soil Conservation—a reprint, 4 p.
Some Physical Facts About Connecticut Soils, 8 p.

State Board of Fisheries and Game, State Office Bldg., Hartford, Connecticut.
Pheasant Mortality and Nesting Success, 46 p.
Seed-Stock Refuge Investigation, 34 p.
Cooperative Game Programs, 1952, 12 p.

Connecticut Light and Power Co., Hartford, Connecticut.
Film—Your Light and Your Future.

Conservation Foundation, 30 East 40th St., New York 16, N. Y.
Conservation Handbook by Samuel H. Ordway, Jr., 76 p., $1.00.
Our Imperiled Resources—a discussion guide, 1948, 21 p.
This Land of Ours—#162 Public Affairs Pamphlet, 32 p., $.30.

Cornell University, Ithaca, New York.
Cornell Rural School Leaflet—edited by E. L. Palmer, 4 times a year, $.50.
Conserve Our Soil, Forest & Wildlife—Bulletin #77, 51 p., $.30.
Conservation—a handbook for teachers, 10 p., $.20.
Inservice Training in Conservation by Helen B. Rose.
Back issues of Leaflets, $.10. List is available.

Cranbrook Institute of Science, Bloomfield Hills, Michigan.
Bird Houses, Baths and Feed Shelters, $.20.

Crime Prevention Association of Philadelphia, Room 801, Administration Building, 21st St. and the Parkway, Philadelphia 3, Pennsylvania.
The Conservation of Human and Spiritual Resources, 1950, 93 p.

Crown Zellerbach Corporation, 534 Battery St., San Francisco 20, California.
Growing Paper on Tree Farms.

Deere and Company, Moline, Illinois.
Hungry Soil, 47 p.
Soil Conservation, 31 p.

Defenders of Fur Bearers, 1214 16th St., N.W., Washington, D. C.
Leaflets on conservation of animals.
Junior Club Activity—Six animal stories and letters a year, membership—$.25.

Delaware

Board of Game and Fish Commissioners, Dover, Delaware.
Waterfowl Management, 7 p.
Deer Management, 11 p.
Pheasant Management, 5 p.
Marsh Racoon Control, 2 p.
Evergreen Trees for Wildlife Cover.
List is available.

Soil Conservation Service, Newark, Delaware.
Our Land—Yours and Mine, 6 p.
1951 Delaware Drainage Law, 17 p.
List is available.

University of Delaware, Agricultural Experimental Station, Newark, Delaware.
Bulletin #51, Films, Bulletins, Leaflets.

State of Delaware, Water Pollution Commission, Dover, Delaware.
Annual Report of Water Pollution Commission—1950–51.
Annual Report of Water Pollution Commission—1951–52, 12 p.
Annual Report of Water Pollution Commission—1949–50, 12 p.
With colored illustrations.

Department of Agriculture, Science Service, Ottawa, Canada.
Slug Control in Canada, 5 p.
Forest Insect and Disease Survey, 152 p.
List is available.

Dwinell-Wright Co., 68 Fargo St., P. O. Box 1871, Boston, Massachusetts.
Bird Booklet—free to teachers, additional copies, $.03.

Emergency Conservation Committee, 767 Lexington Ave., New York, N. Y.
Reprints—*Golden Rule for Wildlife*, 4 p., *Save Our Hawks*, 6 p., *Epic of Hawk Mountain*, 6 p., *Sacred Cows & Public Lands*, 12 p.
Conservation Series, $.15 each. List is available.

Esso Standard Oil Co., 15 West 51st St., New York 19, N. Y.
Oil Serves You, 16 p.
Facts About Oil, 30 p.

Ethyl Corporation, 100 Park Ave., New York 17, N. Y.
Ethyl News—free publication, contains articles on conservation.

Harry Ferguson, Inc., Box 322, Roosevelt Park Ave. Station, Detroit 32, Michigan.
There Goes a Thousand Million Dollars a Year, 28 p.

Firestone Tire & Rubber Co., Dept. of Public Relations, Akron, Ohio.
4-H Program: Soil and Water Manual for Leaders, 26 p.
Booklet and samples of rubber.

Fisherman Press, Inc., Oxford, Ohio.
True-To-Life Stories, series by Dr. R. W. Eschmeyer, $.50 each.
Billy Bass, 47 p.
Tommy Trout, 48 p.
Freddy Fox Squirrel, 49 p.
Bobby Bluegill, 47 p.
Bob White, 47 p.
Charley Cotton Tail, 50 p.

Florida

Project in Applied Economics, University of Florida, College of Education, Gainesville, Florida.
Water, $.35.
Fire, $.35.
Sam Buys a Farm, $.35.
Muddy Waters, 94 p., $.35.
List is available.

Southern States Work Conference & Committee on Southern Regional Studies & Education, State Department of Education, Tallahassee, Florida.
Learning by Living—education for wise use of resources, 122 p., $.50.

University of Florida, Agricultural Experimental Stations, College of Agriculture, Gainesville, Florida.
Bul. 265—*Effect of Frequent Fires on Chemical Composition of Forest Soils in the Longleaf Pine Region.*
Bul. 378—*Water Control in the Peat & Muck Soil of the Everglades.*
Bul. 433—*Organic Matter in Florida Soils.*
Bul. 442—*Soils, Geology & Water Control in Everglades Region.*
Bul. 602—*Composting and Mulching.*

Foreign Policy Association, Inc., 22 East 38th St., New York 16, N. Y.
Europe's Homeless Millions, 64 p., $.35.
Restless India, 64 p., $.35.
Man and Food, 64 p., $.35. Headline Series, #73.

Forestry Industries Information Committee of Minnesota, 516 Lyceum Building, Duluth, Minnesota.
Cutting Small Trees Does Not Pay, 4 p.
Jobs Are Burning Up, 4 p.
It Pays to Manage Jack Pine, 8 p.
Conservation of the Forest Wealth of Minnesota, 4 p.

Friends of the Land, 1368 N. High St., Columbus, Ohio.
Soil and Health, 13 p.
Reprints—*Let's Teach Water Conservation*, 6 p., *How to Read a Landscape*, 4 p., *Biography of a Watershed*, 2 p., other material.
The Land—a quarterly, $5.00 yr.

Garden Clubs of America, Conservation and Roadside Committee, 15 East 58th St., New York 22, N. Y.
Conservation Newsletter—free publication to schools.
Helpful Hints on Conserving Wild Flowers—leaflet, 4 p.
Definitions of Conservation Farming Practices—leaflet, 4 p.
Within Your Garden Wall—one sheet.
Conservation Please, $1.00.
Conservation—Camp, Laboratories and Workshop—a reprint, 10 p.

General Motors, Detroit 2, Michigan.
The Fight to Save America's Water—cartoon type.
Adventure in Public Health and Conservation, 16 p.

George Peabody College for Teachers, Nashville 4, Tenn., Division of Survey and Field Services.
The School and the Changing Pattern of Country Life—Reprint of Southern Rural Life Conference—1943, 100 p.
Your Regions Resources, an annotated bibliography of Southern Resources, 149 p., $.25.
Bibliography of Free and Inexpensive Learning Materials, 175 p., $.25.

Georgia

Georgia Dept. of Commerce, 100 State Capitol, Atlanta, Georgia.
Georgia Has Timber—leaflet, 4 p.
Georgia Invites Industry—leaflet, 4 p.
Water and Power—leaflet, 4 p.

Publication Committee, West Georgia College, Carrollton, Georgia.
Let's Plant Grass, $.15.
Let's Raise Pigs, $.15.

Southern Regional Studies and Committee on Education, 830 E. Peachtree St., N.E., Atlanta, Georgia.
Education Helps Build a Region, 171 p.
Schools and Community Resources, $.15.
Selected Bibliography for Resource-Use Education, 8 p.

Girl Scouts, Inc., 155 East 44th St., New York 17, N. Y.
Nature in Camp
Girl Scout Conservation Program, mimeo., 8 p.
Ranger Aids—a project in conservation for senior Girl Scouts, mimeo., 8 p.
Leader's Nature Guide, $.35.
Lou Henry Hoover Memorial Conservation Project.

P. H. Glatfelter Company, Spring Grove, Pennsylvania.
Forestry and Paper, 31 p.

B. F. Goodrich Company, Akron, Ohio.
Wonder Book of Rubber, 32 p., comic book type.
Story of Rubber, Teacher's Manual.

Health Information Foundation, 420 Lexington Ave., New York 17, N. Y.
The Story of H. I. F.
Progress in Health Services—publication.

F. C. Huyck & Sons, Kenwood Mills, Albany, New York.
Paper, Peacemaker of Progress.

Idaho

University of Idaho, Agricultural Experimental Station, Moscow, Idaho.
Land Capability for Soil and Water Conservation in Idaho.

Illinois

State of Illinois, Dept. of Conservation, Springfield, Illinois.
The Manual of Illinois Snakes, 35 p.
Forest Trees of Illinois, 70 p.
Migratory Bird Regulations, 4 p.
Illinois Fish Management Program, 4 p.
Publication—*Outdoor in Illinois*, $1.00 year.
Publications not sent out of State.

State of Illinois, Office of the Superintendent of Public Instruction, Springfield, Illinois.
Curriculum and Course of Study Guide for Elementary Schools in Illinois, Science Area, Concept #8.
This Is Our Soil by Ernest D. Walker and Albert S. Foster, 48 p., or available from University Press, Urbana, Ill., $.30.

Illinois Natural History Survey, Urbana, Illinois.
Bird Dogs in Sport and Conservation.
For Youngsters Outdoors—Waterfowl, 1 p., Fishing Know-How, 1 p.

Illinois State Museum, Springfield, Illinois.
Common Insects of Illinois, 48 p.
Exploring for Mushrooms, 47 p.
Flowers That Bloom in the Spring, 48 p.
Illinois Mammals, 48 p.
Invitation to Birds, 48 p.
Free to teachers and libraries.

University of Illinois, Agricultural Experiment Station, Urbana, Illinois.
Grass of Gullies, 20 p.
Protect Your Soil, 23 p.
#644, *The Story of a Lake*, 14 p.
Reclaiming Illinois Strip Coal Lands by Forest Planting.
#567, *Forest Planting on Illinois Farms.*
List is available

Illinois Federation of Sportsmen's Clubs, Executive Secretary, Royal B. McClelland, 508 W. Charles St., Champaign, Illinois.
Illinois Wildlife—publication, $.25 junior rate.

Illinois Junior Academy of Science, Chairman, Joan Hunter, Edwardsville High School, Edwardsville, Illinois.
Information on club activities, projects and year book.

Illinois Nature Conservancy, Chairman, Dr. James M. Sanders, Chicago Teachers College, 6800 Stewart Ave., Chicago 21, Illinois.
Seasonal bulletins and conservation education material, $.50 annual membership.

Illinois Society for Mental Health, Inc., 123 W. Madison St., Chicago 2, Illinois, Thomas Blakley, Exec. Director.
Material on conservation of human resources.

Illinois Society for Medical Research, Dr. N. Brewer, 951 E. 58th, Chicago 37, Illinois.
Material on conservation of human resources.

Indiana

Indiana Dept. of Agriculture, 311 W. Washington St., Indianapolis, Indiana.
Outdoor Indiana—monthly publication.

Indiana Dept. of Conservation, Division of Fish and Game, Indianapolis, Indiana.
Conservation of Fishes, 51 p.
Indiana Hawks and Owls, 37 p.
Gray and Fox Squirrel Management in Indiana, 112 p.

Conservation of Wildlife in Indiana, 64 p.
Save Indiana's Waters, 15 p.
Conservation of Soils, 40 p.
Indiana Ponds—Their Construction and Management, 35 p.
Conservation of Plants, 39 p.

Purdue University, Co-operative Extension Work, Agriculture and Home Economics, State of Indiana, Lafayette, Indiana.
Bul. #173-3—*Conservation of Plants*, 1947, 40 p.
Bul. #173-1—*Conservation of Wildlife in Indiana*, 64 p.

Inland Bird Banding Ass'n., O. A. Stevens, State College Station, Fargo, North Dakota.
Inland Bird Banding News.
Assorted items on this subject.
Single copies to teachers.

Inland Steel, Chicago, Illinois.
Picture Story of Steel, 47 p.
How Steel Is Made.

International Harvester Co., 180 N. Michigan Ave., Chicago 1, Illinois.
Make the Soil Productive, 64 p.
Let's Practice Soil Conservation, 23 p.
100 Years in Agriculture and Industry, 29 p.
Land of Plenty, 62 p.
Man and the Soil, 110 p.
List of available films.

International Paper Co., Southern Craft Division, Mobile 9, Alabama.
Little Trees That Went to School.
Junior Forest Fire Fighting Wardens—Junior Club Activity.
Suggestions for teachers.

Interstate Oil Compact Commission, Box 3127, State Capitol, Oklahoma City, Oklahoma.
Oil and Gas Conservation, mimeo., 12 p.
Saving Your Oil, mimeo., 20 p.
The Nation's Reserves of Natural Gas, mimeo, 8 p.
Conservation of Oil and Gas Resources of the Continental Shelf, mimeo., 4 p.
List is available.

Interstate Printers and Publishers, Danville, Illinois.
This Is Our Soil, $.50.

Iowa

Iowa Teachers Conservation Camp, Seymour Fowler, Director, Iowa State Teachers College, Dept. of Science, Cedar Falls, Iowa.
Selected conservation films and filmstrips for Iowa Schools, mimeo., or available from Dr. Emory L. Will, Director State Teachers College, Dept. of Science, Oneonta, New York.

Iowa State Teachers College, Education Service Publication, Cedar Falls, Iowa.
Using Nature's Gifts—Petroleum, Coal, Iron Ore, $.25.
Water We Use and Misuse, $.25.
Protecting Our Forest Wealth, $.25.
Conservation Journeys for Boys and Girls, $.20.
Nature Study Equipment, How to Make and Use It, $.25.

Iowa State College, Extension Division, Ames, Iowa.
R-381—*Returns From and Capital Required for Soil Conservation*, $.17.
R-383—*Economics of Crop Rotation and Land Use*, $.14.
E-241—*Winter Birds Around My Home*, $.15.
E-247—*Nesting Birds of Iowa*, $.25.
P-3 —*Fur-Bearers and Game Mammals of Iowa*, $.10.
List is available.

Iowa State Conservation Commission, East 7th and Fourth, Des Moines, Iowa.
A Peek at Iowa Wildlife, 26 p.
Forest and Flame in the Bible, 15 p.
Bird Study for Schools, mimeo.
List of publications is available.

Izaak Walton League of America, Inc., 31 N. State St., Chicago 2, Illinois.
Conservation Workbook. A sample workbook as used in Iowa for grades 5–8 dealing chiefly with soil.
"As the Twig Is Bent"—an adventure in conservation teaching.
The Fight to Save America's Waters—comic book treatment of pollution.
Water Pollution and Your Health, $.01 for 2.
Pollution and Polio, $.01 for 2.
Johnny Grass Seed—conservation project for all, $.05.
Keys to Conservation Action—conservation policies of the league, $.10.
Many booklets from other organizations are available from this office.

Kaerne Publications, Ltd., 704 McIntyre Bldg., Winnipeg, Canada.
National Wildlife and Conservation Digest—monthly publication, $3.00 yr.

Kansas

Department of Agriculture, Topeka, Kansas.
Insects in Kansas, 440 p.
Birds in Kansas, 340 p.
Soil Conservation in Kansas—a report, 179 p.
Weed Handbook, 38 p.
List of similar publications is available.

Kansas State College, Agricultural Experiment Station, Manhattan, Kansas.
Woodlands of Kansas, 42 p.
Soil Fertility, 60 p.
Alfalfa in Kansas, June 1951, 65 p.
Fertilizer Recommendations for Kansas, 1952, 33 p.
Insects Affecting Alfalfa Seed Production, 1951, 64 p.

Kentucky

Bureau of School Service, College of Education, University of Kentucky, Lexington, Kentucky.
New Concept of Human Relations—Vol. 21, #3, $.50.
We Plan a Garden, $.25.
Improving the Garden, $.25.
Fire, $.35.
Scientists Look at Resources, $.50.
List is available.

Department of Conservation, Division of Forestry, Commonwealth of Kentucky, Lexington, Kentucky.
Kentucky's Resources—Bulletin.
Flood Control and Water Usage in Kentucky.

Kennebec Valley Garden Club, Augusta, Maine.
Plant Conservation List for the State of Maine.

Keystone Steel and Wire Co., Peoria 7, Illinois.
Practical Land Use, 12 p.

Lathrop Pack Forestry Foundation, 1214 16th St., N.W., Washington, D. C.
Land Hunger in Mexico by Tom Gill, $1.00.

Louisiana

Department of Agriculture and Immigration, Baton Rouge, Louisiana.
Brief Discussions of History of Sugar Cane and Rice.
Samples of raw materials.

State of Louisiana, Dept. of Education, Baton Rouge, Louisiana.
The Mississippi River, $.14.
#679 *Behind the Curtain of Green*, Forestry for grades 1-12, 112 p.
#715 *Soil Conservation—A La Louisanne*, 130 p.

Louisiana Dept. of Wildlife and Fisheries, 128 Civil Courts Bldg., New Orleans, Louisiana.

Louisiana Conservationist—monthly publication.
Fourth Biennial Report—1950–51, 481 p.

Louisiana Forestry Commission, Baton Rouge, Louisiana.
Growing Trees for Profit (single copies to teachers), 8 p.
Louisiana Forestry Facts and Figures.
Louisiana Trees.
Louisiana State Fire Control Management—a leaflet, 8 p.

Mahogany Association, Inc., 75 E. Wacker Drive, Chicago 1, Illinois.
The Mahogany Book, 30 p.
Mahogany—Wood of the Ages. Also film.

Maine

State Department of Education, Augusta, Maine.
Maine Schools—Introduction to Conservation Education—April 1951, Vol. 20, #4, 16 p.
Science Education for Maine Secondary Schools, $.75.

Mallinckrodt Chemical Works, Mallinckrodt St., St. Louis 7, Missouri.
Chart—History of Chemistry—contains material on conservation of scarce alloying metals.

Maryland

Board of Natural Resources, State Office Building, Annapolis, Maryland.
Things to Do in Conservation—A Teacher's Guide, 41 p., $.25.
Maryland's Oyster Problem, 12 p., $.15.
Maryland's Natural Resources at a Glance, 12 p., $.05.
Maryland's Forests and Forestry, 56 p., $.25.
Trees of Maryland, 23 p., $.25.

Department of Geology, Mines and Water Resources, Johns Hopkins University, Baltimore, Maryland.
Shore Erosion in Tidewater Maryland, 141 p.
The Shore Erosion Problem—Reprint from Bulletin 6.

Department of Research and Education, P.O. Box 1510, Annapolis, Maryland.
Things to Do in Conservation, $.15.
Scientific and educational bulletins on commercial fisheries and natural resources.
List is available.

Maryland Game and Inland Fish Commission, 516 Munsey Bldg., Baltimore 2, Maryland.
Maryland Inland Fishing Guide, 16 p.
Maryland Conservationist—publication, $1.00.
Maryland Farm Game Habitat Restoration Programs, 11 p.
The Common Fishes of Maryland, 45 p.
List of publications available.

Maryland State Soil Conservation Commission, College Park, Maryland.
Safeguarding Our Soil and Water Resources.
Our Land and Its Care.
Youth Can Conserve These Resources.
Teaching Aids for Conservation Education.

University of Maryland, Extension Service, College Park, Maryland.
Trees of Maryland.
Growing Christmas Trees in Maryland.

Water Pollution Control Commission, 2114 N. Charles St., Baltimore 18, Maryland.
Fight to Save America's Water—comic type booklet.
Water Pollution Control—Everybody's Business—Everybody's Job—leaflet, 1 p.

Massachusetts

Department of Conservation, Division of Parks and Recreation, 15 Ashburton Place, Boston, Massachusetts.
State Forests, Parks and Reservations of Massachusetts.

University of Massachusetts, Extension Service, Amherst, Massachusetts.
Conservation of Massachusetts Soils—A 193. $.10.
Improving Land the Modern Way—A 122. $.10.

Meals for Millions Foundation, Inc., 648 S. Broadway, Los Angeles, California.
Narrative section of Progress Report—*The 3¢ Challenge to World Hunger*, 23 p., $.25.

Charles E. Merrill Co., Columbus 15, Ohio.
Little Wonder Books—*Balance in Nature, Where Animals Live, Plants That Give Us Food*, many titles, $.15 each.
Conservation of Natural Resources—a text unit, 48 p., $.20.

Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh 13, Pennsylvania.
Reprints—*Any Old Rags to Sell?*, 8 p., *Petroleum—Then and Now*, 12 p., *Theory & Practice in Stream Pollution Control*, 12 p., *Steel Industry*, 7 p.

Michigan

Michigan Department of Conservation, Education Division, Lansing, Michigan.
Field Trips—Handbook for leaders, 26 p.
Wildlife Conservation.
Soil Conservation and Land Use, 10 p.
Trees, Woodlots and Forests, 15 p.
Geology or Earth History and Mineral Resources, 14 p.
Michigan Conservation—publication, $.50 year.
Bulletins, books, and Visual Aids—on subjects relating to conservation of natural resources, 24 p.
Michigan Department of Conservation—Its Organization and Functions.
Rocks and Minerals of Michigan, $.50.
Michigan Wildlife Sketches, $.25.
Michigan Trees Worth Knowing, $.30.
Helps for Teachers—Conservation compendium, 40 p.

Michigan State College, Dept. of Information Services, Bulletin Office, East Lansing, Michigan.
E 203—*Conserving Soil by Better Land-Use Practices*, 31 p.
E 218—*Producing Wildlife by Good Farm Land Use*, 22 p.
E 252—*Good Eating from Woods and Fields* (not distributed outside of Michigan).
E 253—*Venison from Forest to Table.*

Michigan State Soil Conservation, c/o Michigan State College, East Lansing, Michigan.
Top Soil and Its Care, Annual Report, 1947–48.
Soil Conservation Districts in Michigan.
Biennial Report for 1949–50.

Northern Michigan College of Education, Marquette, Michigan.
Special Problems in the Teaching of Conservation, 99 p., $1.00.

Michigan Audubon Society, Robert A. Whiting, 1228 Chittock Ave., Jackson, Michigan.
Enjoying Birds in Michigan, $1.00.

Minnesota

Minnesota Department of Conservation, State Office Bldg., Room 633, St. Paul 1, Minnesota.
The Conservation Volunteer—publication, limited.

Minnesota State Department of Education, St. Paul, Minnesota.
A Guide for Instruction in Science and Conservation, $1.00.
Order from Syndicate Printing Co., 501 Park Ave., Minneapolic 15, Minn.

University of Minnesota, Institute of Agriculture, University Farm, St. Paul 1, Minnesota.
Our Soil to Use, 43 p.
Wind Erosion Control, 15 p.
Better Soil for Better Living, 30 p.

Mississippi

Mississippi State College, School of Education, Dept. of Resource-Use Education, State College, Mississippi.
Mississippi Mineral Resources, mimeo., 7 p.
Mississippi Water Resources, mimeo., 9 p.
Conserving Our Forests—Teaching unit—Grades 4–5, 11 p.
Instructional Materials in Resource-Use Education—Instructional Bibliography for Elementary and High School, 24 p.
Conservation of Wild Flowers—Teaching unit, Grade 3, 7 p.
Sam Learns to Improve the Farm—5th grade, 17 p.
Partnership for Plenty—1949, 30 p.
Busy Raindrops—for lower grades, mimeo., 13 p.

State Fish and Game Commission, Box 451, Jackson, Mississippi.
Birds and Animals of Mississippi, mimeo., 27 p.

Mississippi Forest Service, P.O. Box 649, Jackson, Mississippi.
Mississippi Timber Stands Before and After Cutting, 19 p.
Planting Southern Pines, 8 p.
Cutting for Profit in Southern Pine Woodlands, 24 p.
The Story of Pulp and Paper, 14 p.
Mississippi Forest and Park Services, 36 p. (Biennial Reports 1949–51.)
Mississippi Forests and Parks—Publication, monthly.
Your Timber and Your Challenge, 24 p.
Your Country, Your Tree, Your Future, 16 p.

Mississippi State College, Agricultural Experiment Station, Forestry Dept., State College, Mississippi.
Farm and Forestry in Mississippi, 120 p.
Know Your Trees, 36 p.

Mississippi Valley Association, Chicago Office, 343 South Dearborn St., Chicago 4, Illinois.
Handbook for Directors of Soil Conservation Districts, 77 p.
Our Waterways—Facts and Comments, 28 p.
The Inland Waterways and Mass Production, 42 p.
Conservation of Land and Water Resources, 37 p.
Resources and Opportunities of the Mid-Continent Area of the United States, 50 p.

Missouri

Missouri Conservation Commission, Monroe Bldg., Jefferson City, Missouri.
Available to Missouri Teachers only:
Missouri Furbearers, 20 p.
Forestry in Missouri, 26 p.
Conservation Teachers Manual—Vol. IV, Forestry, 35 p.
Conservation Teachers Manual—Vol. V, Birds, 29 p.
Conservation Teachers Manual—Vol. VII, Fish, 37 p.
Conservation Teachers Manual—Vol. III, Water, 28 p.
Conservation Teachers Manual—Vol. II, Soils, 30 p.
Conservation Teachers Manual—Vol. VI, Mammals, 29 p.
How to Become a Missouri Nature Knight, 8 p.
The Missouri Nature Knights—Leader's Guide.
Ponds for Fish and Wildlife Production, 32 p.
Forest Fires in Missouri, 26 p.
Conservation Sketch Book, $.20.
List is available.

University of Missouri, College of Agriculture, Agriculture Extension Service, Columbia, Missouri.
Missouri Farm People Move Ahead, 32 p.
Characteristics of Farm Ponds, 34 p.
Soil Improvement and Soil Conservation in Missouri, 35 p.
Water and Its Conservation, 40 p.
Also list.

Monsanto Chemical Co., St. Louis 4, Missouri.
Krilium—Soil Conditioner, 26 p.
Krilium—Soil Conditioner in Agriculture, 8 p.
Krilium Gardener's Guide.

Montana

Montana Agricultural Station, Bozeman, Montana.
Control and Use of Resources in the Development of Irrigated Farms—B 476.
Recommended Practices for Soil Erosion Control—C 190.
Irrigation Development in Montana—B 427.
List is available.

Montana Dept. of Fish and Game, Helena, Montana.
Montana Wildlife, a publication. Other leaflets.
Hunting and Fishing in Montana.

Montana State Water Conservation Board, Mitchell Bldg., Helena, Montana.
Irrigation Pays.

Morton Arboretum, Lisle, Illinois.
Bulletin of Popular Information $1.00 per year.
Mimeographed sheets on teaching trees, animals, etc., $.01.
List is available.

National Association of Biology Teachers, Dr. Richard Weaver, Project Director of the National Committee on Conservation, P.O. Box 2073, Ann Arbor, Michigan.
Criteria for Teaching Conservation in Biology, 4 p.

National Association of Manufacturers, 231 S. La Salle St., Chicago, Illinois, or your regional office.
Water in Industry, 48 p., single copies available.
Our Land and Our Spirit, 16 p., available in quantities up to 25.
Symposium—Applied Research, 22 p., single copies.
List is available.

National Ass'n. of Electric Companies, 1200 18th St., N.W., Washington 6, D. C.
More and More and More—booklet on power.

National Association of Soil Conservation Districts, League City, Texas.
Soil Conservation Is People.
Help Build Our Land and Liberty.
American Soil Conservation District News—publication.

National Audubon Society, 1130 Fifth Avenue, New York 28, N. Y.
Bird and Mammal Charts—color, set of 4, $3.00.
Audubon Nature Bulletins, $.15 each, 5 or more, $.10 each—60 subjects.
Outdoors Illustrated, a publication for teachers and club organizers, 5 issues $1.50.
Club activities material.
Guide for Leaders of Audubon Clubs, $1.00.
Audubon Magazine—a publication.
List of materials available.

National Committee on Policies in Conservation Education, 1409 Garfield St., Laramie, Wyoming.
Proposal for Formulating National Policies, $.10.
Report of the National Committee on Policies in Conservation Education, 1948, 15 p., $.10.
Report of the Workshop Conference, 1948, $.12.
Some Selected References on Conservation for Pupils and Teachers, $.05.
Training Teachers for Conservation Education, $.15.
Conservation in the Schools—report of Lake Villa Workshop, $.15.
The Goal of the National Committee on Policies in Conservation Education, $.05.

National Committee on Policies in Conservation Education, R. H. Eckelberg, Chairman, Ohio State University, Columbus 10, Ohio.
Selected References on Conservation for Pupils and Teachers, 4 p., $.05.
National Cotton Council, P.O. Box 76, Memphis, Tenn.
History of Cotton Textiles.
Story of Cotton.
National Education Association, Dept. of Rural Education, 1201 16th St., N.W., Washington 6, D. C.
Conservation Education in Rural Schools, 1952, Effie G. Bathurst, Ed., 114 p., $.50.
National Fertilizer Association, 616 Continental Building, Washington 5, D. C.
Hunger Signs in Crops.
Organic Matter—The Life of the Soil, 8 p.
Food, Feed and Fertilizer, 14 p.
Fertilizers and Good Farming, 43 p.
Also filmstrips, color and black and white films—free loan.
National Garden Institute, 1368 N. High St., Columbus 1, Ohio.
School Gardengrams—Lesson Units by Paul Young, free monthly publication for schools, 4 p.
National Geographic Society, School Service Division, Washington 6, D. C.
Separate color sheets from the *National Geographic Magazine*. Many subjects, including fish, birds, insects, and animals, 48 sheets for $.50.
List is available.
National Information Committee on Lighting, 1410 Terminal Tower, Celeveland 13, Ohio.
Lighting and the Nation's Welfare.
National Lime Association, 925 15th St., Washington 5, D. C.
Lime in Agriculture.
Nitrogen from the Air.
Stabilization of Road Beds with Lime.
National Lumber Manufacturers Ass'n., 1319 18th St., Washington 6, D. C.
The Nation's Wood Supply, 23 p.
America's Forest Resources, 16 p.
National Planning Association, 800 21st St., N.W., Washington 6, D. C.
Regional Resources Development by A. H. Hansen and H. S. Perloff, Planning Pamphlet #16, 40 p., $.25.
National Recreational Association, 315 Fourth Ave., New York 10, N. Y.
Adventuring in Nature—interesting nature projects, $.75.
National Wildlife Federation, 3308 14th St., N.W., Washington 5, D. C.
Conservation Education Series—*Meet the Landscape, Wings Over the Landscape, Cold Facts from the Landscape.*
A Desert in Your Own Backyard, 16 p.
Conservation Leaflets—*Song Birds, Mammals, Soil, Water and You, Pollution, Trees* and others.
13 Approaches to Conservation—a reference for high school students.
Conservation Film Library Catalogue.
List of free literature is available.

Nebraska

Dept. of Public Instruction, Capitol Bldg., Division of Supervision and Curriculum, Lincoln, Nebraska.
Save Our Soil—Resource Unit for High School, 34 p.
Bibliography—books and audio-visual aids for teaching conservation in elementary schools, 16 p.
University of Nebraska, College of Agriculture Extension Service, Lincoln 5, Nebraska.
Factors Toward Stability in the Great Plains. 1951 report of Great Plains Agricultural Council Session at Laramie, Wyo., 1950.

Nevada

Nevada State Department of Public Instruction, Carson City, Nevada.
Conservation and Nevada, $.75.

New Hampshire

Department of Education, New Hampshire State Board of Education, Concord, New Hampshire.
Forestry—Conservation of Natural Resources, 48 p.
State of New Hampshire Forestry and Recreation Dept., 401 State Office Building, Concord, New Hampshire.
State of New Hampshire Biennial Report of the Forester, 71 p.
University of New Hampshire, Agricultural Experiment Station, Durham, New Hampshire.
Soil Fertility in Its Broader Implications.
List is available.
New Idea Farm Equipment Company, Coldwater, Ohio.
Tried and New Ideas for Handling Barnyard Manure, 18 p.

New Jersey

Department of Conservation, Bureau of Public Relations, 425 State House Annex, Trenton, New Jersey.
Forest Management in New Jersey, 54 p.
Put Wasteland to Work.
List is available.
Extension Service, College of Agriculture, New Brunswick, New Jersey.
Man and the Soil.
Our Land and Its Care.
New Jersey School of Conservation, Upper Montclair, New Jersey.
Working With Soil by Marie Kuhnen, $.15.
Teaching aids.
State of New Jersey, State Teachers College, Trenton, New Jersey.
Activities in Conservation, mimeo., 5 p.
Pupil Activities Related to Water, mimeo., 3 p.

New Mexico

New Mexico College of Agriculture, Extension Service, Bulletin Section, State College, New Mexico.
C 149—*Erosion Control—Crops and Practices.*
C 221—*Conservation Practices for Wheatlands of New Mexico.*
Soil Conservation Service, Information Division, Albuquerque, New Mexico.
Suggestions for Teaching Conservation in Schools of the Western States, 78 p.
University of New Mexico Press, Albuquerque, New Mexico.
Toward Better Teaching of Soil and Water, 22 p., $.25.

New York

New York State College of Agriculture, Dept. of Extension Teaching and Information, Ithaca, New York.
Land Use in New York, $.05.
Conserve Our Soil, Forest and Wildlife, #J 77, Nov. 1951, $.30.
Preventing Soil Losses During Fall, Winter and Spring, $.05.
List of publications is available.

North Carolina

Dept. of Conservation and Development, Raleigh, North Carolina.
North Carolina's Natural Resources—Resource Bulletin Series, 54 p.
Hand Crafts in North Carolina, 19 p.
The Value of North Carolina's Game and Fish, 32 p.

North Carolina Resource-Use Education Commission, Education Building, Raleigh, North Carolina.
Tar Heel Family—sound movie and film guide.
Reports of Annual Summer work conferences.
Schools Unlimited—guide for developing school grounds as outdoor laboratories, 4 p.
Units on Resource-Use education.

North Carolina Wildlife Resources Commission, Raleigh, North Carolina.
Conservation of Wildlife.
Other publications and films. List is available.

University of North Carolina, State College of Agriculture and Engineering, State College Station, Raleigh, North Carolina.
Cir. 222—*Terracing to Reduce Erosion*, 30 p.
Cir. 329—*Laying Off Rows by String Methods*, 12 p.
Cir. 303—*Sod Field Waterways*, 8 p.
Cir. 371—*Plant Forest Trees.*

North Dakota

North Dakota Agricultural College, Fargo, North Dakota.
Uses and Management of Ponds and Lakes, 40 p.
List is available.

State of North Dakota, Dept. of Public Instructions, Bismarck, North Dakota.
Conservation—Soil and Water, 127 p., $1.00.

Northern Great Plains Conservation Education Commission, Lincoln, Nebraska.
Education in Conservation of Soil and Water, 47 p.

Northeastern Wood Utilization Council, 839 Chapel St., New Haven 6, Connecticut.
How to Burn Wood, $.25.
List is available.

Ohio

Ohio Agricultural Experiment Station, Wooster, Ohio.
Conservation Problems and Achievements on Selected Midwest Farms, 53 p.

Ohio Division of Wildlife, 1500 Dublin Road, Columbus 12, Ohio.
Program and Policy for Fish, a leaflet.
History of Wildlife Conservation in Ohio, mimeo., 3 p.
Birds of Ohio, 8 p.
List of publications is available.

Dept. of Natural Resources, Division of Wildlife, Public Relations Section, 1500 Dublin Road, Columbus 12, Ohio.
The Ohio Conservation Bulletin—monthly publication, $1.00 year.

Ohio Leather Company, Girard, Ohio.
The Story of Leather.

Oklahoma

Oklahoma A. and M. College, Division of Agriculture, Stillwater, Oklahoma.
What's New in Oklahoma Agriculture—a list of publications, 8 p.
Plant Trees for Prosperity and Posterity—E-403.
Land Appreciation—#510.
Know Your Soil—#509.

Oklahoma Planning and Resource Board, Division of Forestry and State Parks, Oklahoma City 5, Oklahoma.
Planting and Care of the Forest—#6.
Oklahoma's Forests and Forestry Activities, 13 p.

Oklahoma Planning and Resource Board, 533 State Capitol Building, Oklahoma City, Oklahoma.
Travel Stamp Album and Guide Book, Oklahoma Holiday with Nature for Company, 26 p.

Oregon

Oregon State College, Agricultural Experiment Station, Federal Cooperative Extension Service, Corvallis, Oregon.
Soil and Water Conservation, Oregon Agriculture—#9, 75 p.
Land Use Ordinances of Soil.

Oregon State Game Commission, 1634 N. Alder St., Portland 8, Oregon.
Raising a Brood of Pheasants, 18 p.
Oregon Sage Grouse, 29 p.
Oregon's Back Country Lakes, 22 p.
Oregon's Game Fish, 18 p.
Oregon State Game Commission, mimeo.
Oregon's Big Game Resources, 34 p.
List is available.

Outdoor Life, 353 Fourth Avenue, New York 10, N. Y.
Conservation pledges, list is available.

Outdoor Publishing Co., P.O. Box 589, Pasadena 19, California.
Earth and Sky, 4 p., science magazine for children, 2 semester subscription, $1.20, single subscription, rates for quantity.

F. A. Owens Publishing Co., The Instructor Magazine, Dansville, N. Y.
Unit and pictures—Natural Resources and Science Topics, $.50 ea.

Pan American Union, Division of Agriculture and Conservation, Washington, D. C.
The Role of Conservation in the Education Program of Latin-America—1951, 56 p.
Conservation in the Americas—quarterly publication, 40 p., free.

Pennsylvania

Pennsylvania Dept. of Public Instruction, Harrisburg, Pennsylvania.
Elementary Course of Study, 285 p., 1949, inexpensive.

Pennsylvania Game Commission, 430 North St., Harrisburg, Pennsylvania.
How to Trap Furbearing Animals, 31 p.
Conservation posters.
Pennsylvania Game News, $1.00 per year.
Sportsman's Guide to Wild Ducks, $.25.
Colored Bird Charts, 4 for $1.50.
Pennsylvania Bird Life, $.50.
Wild Life in the Farm Program, 48 p.
More Food for Upland Game, 44 p.
Attracting Birds, 8 p.
Some Pennsylvania Snakes, 7 p.
Farm Youth and Wildlife, 23 p.

Pennsylvania State College, School of Education, State College, Pennsylvania.
The Pennsylvania Conservation Education Laboratory for Teachers, 6 p. Conservation education.

Phillips Petroleum Co., Bartlesville, Oklahoma.
Free Film—"On the Other Side of the Fence."

Public Affairs Committee, 22 E. 38th St., New York 16, N. Y.
#162—*This Land of Ours* by M. S. Stewart & E. C. Mount, 35 p., $.30.
Our Conservation Job, 64 p., $.50.
People, Food and Machines, $.50.
List is available.

Rhode Island

Dept. of Conservation and Agriculture, Providence, Rhode Island.
Seventh Annual Report—1951, 102 p.
A Survey of Rhode Island's Salt and Brackish Water Ponds & Marshes. Water Fowl Fall Migration Check—R. I., 1950.

Row, Peterson Company, Evanston, Illinois.
Basic Science Series—*Balance in Nature, Saving Our Wildlife, Water, Plant and Animal Relationships*, many other titles, $.36–$.48.
Basic Social Education Series—*Buried Sunlight*, $.30, *America's Oil*, $.40, *America's Minerals*, $.40.
Way of Life Series—*Green Kingdom, The Way of Life of a Forest Ranger*, $.72; *Land of Hope, Way of Life in a Tennessee Valley*, $.72.
Write for list.

St. Regis Paper Company, Buckport, Maine.
Forest to Newsprint.
Save the Redwoods League, 250 Administration Bldg., University of California, Berkeley 4, California.
The Story Told by a Fallen Redwood, 8 p.
Redwoods of the Past, 8 p., $.10.
Living Link in History, 8 p.
Trees, Shrubs and Flowers of the Redwood Region, 14 p., $.10.
Sears Roebuck Foundation, Chicago 7, Illinois.
The Lord's Land, 26 p.
The Shawiningan Water and Power Co., P.O. Box 6072, Montreal, Canada or Shawiningan Products Corp., Empire State Bldg., New York, N. Y.
Fifty Years of Achievement, 50 p.
Map and chart.
Shell Oil Co., Public Relations Dept., 50 West 50th St., New York, N. Y.
Oil Serves You, 14 p.
Pete Is a Prime Mover, 52 p.
Waste Not—Want Not—Conservation in Oil Industry, 14 p.
Catalog of free films.
Slingerland Comstock Company, Ithaca, New York.
Aids to Knowing Natural Science—E. Lawrence Palmer.
(Outline drawings of over one thousand subjects, with study outlines included, $.60 per hundred.)
Numerous low cost booklets.
Soil Conservation Society of America, 1016 Paramount Building, Des Moines, Iowa.
Down the River, 14 p., $.10.

South Carolina

Clemson Agricultural College, Extension Service, Clemson College, South Carolina.
Classification & Use of South Carolina Farm Lands, 16 p.
Land Use and Soil Conservation in the Broad River Soil Conservation District of South Carolina, 68 p.
Conservation Farming in Marion County, 23 p.
Soil Conservation for 4-H Clubs—#355, 46 p.
List is available.
Research Planning and Development Board, Dept. W, Box 927, Columbia, South Carolina.
Wildlife Resources, mimeo., 1 p.
Welcome to South Carolina, 18 p.
Natural Resources of South Carolina.

South Dakota

South Dakota State College, Brookings, South Dakota.
B 254—*Evergreens in South Dakota,* 33 p.
B 247—*Shade, Windbreak and Timber Trees of South Dakota,* 48 p.
C 58 —*Soils of South Dakota.*
B 325—*Regrassing Areas in South Dakota,* 47 p.
South Dakota Natural Resources Commission, State Capitol, Pierre, South Dakota.
Selected Bibliography of Materials on Missouri River Basin Development, 15 p.
Agriculture in South Dakota, 12 p.
The Missouri River Basin Program, 6 p.
State of South Dakota, Dept. of Public Instruction, Pierre, South Dakota.
General Sciences for Secondary Schools, 164 p.
Biology for Secondary Schools, 136 p.
General Science for Elementary Schools, 101 p.
These courses contain conservation teaching material for South Dakota teachers.
Southern Cypress Mfg. Ass'n., 507 Barnett Bank Bldg., Jacksonville, Fla.
Tidewater Red Cypress.
Southern Hardwood Producers, Inc., Sterick Bldg., 8 North 3rd St., Memphis 3, Tennessee.
The Southern Hardwoods, 46 p. Also a film.
Southern Oak, 10 p.
A B C's of Gum, 10 p.
Yours Forever—16 mm sound-color film—free except for transportation charges both ways.
Southern Pine Association, Canal Bldg., P.O. Box 1170, New Orleans, Louisiana.
Ten Lessons in Forestry, 56 p.
America's Forest Resources.
Forty Years of Southern Forestry, 12 p.
Facts About the South's Forests.
Southern Pulpwood Conservation Association, 1506 National Bank Bldg., Atlanta 3, Georgia.
Forest Fires—Your Loss, 10 p.
Where Does Our Timber Go, leaflet, 4 p.
Cutting Woodlands, leaflet, 4 p.
Using Our Tree Crop Wisely, 16 p.
Standard Oil Co., Room 1626, 30 Rockefeller Plaza, New York 1, N. Y.
Conservation—Making the Most of Our Soil, 21 p.
Our Inexhaustible Resources.
Swift and Company, Agricultural Research Dept., Chicago 9, Illinois.
Story of the Soil.
Story of Plants.
Story of Grain.
Story of Grass.
Story of Meat Animals.
Elementary Science Booklets—Grades 4–5–6.

Tennessee

Division of State Information, Nashville 3, Tennessee.
Unique Flora of the Great Smoky Mountain National Park.
Tennessee Valley Authority, Knoville, Tennessee.
Operation of the TVA Reservoir System with Map, 9 p.
Soil People and Fertilizer Technology, 57 p.
TVA—1951, 68 p.
Decatur Story, 11 p.
List of films available.
Tennessee Valley Authority, Dept. of Forestry Relations, Norris, Tennessee.
Timber Growing Today—free loan film.
Tennessee Valley Forests, 17 p.
University of Tennessee, Agricultural Experiment Station, Knoxville, Tennessee.
116—*Keeping Tennessee Green Saves Soil.*
269—*Prevent Farm Fires,* 6 p.
321—*Building a Better Tennessee Through Community Improvements,* 20 p.

Texas

Agricultural Extension Service, Texas A & M College, College Station, Texas.
L 81 —*Feed People—Not Rats.*
B 189—*Soils and How to Improve Them.*
L 74 —*Soils of Texas.*
Sbc-13—*The Rains Came.*
List is available.
Texas Forest Service, College Station, Texas.
Pupil Activities in Forestry, 32 p., $.50.
Texas Forest News—publication.
Packet of conservation materials for teachers.
Circular 43—*Forestry Principles for Elementary Schools,* $.25.
Circular 44—*Forestry Principles for Secondary Schools,* $.25.
Texas Game, Fish and Oyster Commission, Director of Education, Austin, Texas.
Wildlife in Texas, 44 p.
Texas Game and Fish—monthly publication, $1.00 per year.
Wildlife Conservation Unit—*The Cardinal,* 5 p.
List of Wildlife Motion Pictures, 3 p.
List of Conservation Education Literature, mimeo., 7 p.

University of Texas, Hogg Foundation of Mental Hygiene, Austin, Texas.
So You Want to Make a Community Study?
Trees for Tomorrow, Inc., Hotel Merrill Bldg., Merrill, Wisconsin.
How to Plant a Tree, 1 p.—Instructional sheets available in quantity.
Trinity Improvement Ass'n., Fort Worth, Texas.
Controlled Water Resources of the Trinity River Watershed.
Union Bag and Paper Corporation, Savannah, Georgia.
Pulpwood, 26 p.
United Nations Educational, Scientific and Cultural Organization, Simone Vincens, Documents Section, New York Office, New York, N. Y.
An International Index of Films on Conservation and Utilization of Resources.
Education for Conservation and for More Efficient Use of Natural Resources, 115 p.
Food and People project booklets, $.25. List is available.

UNITED STATES—Governmental Agencies

Federal Security Agency Regional Office, Great Lakes Drainage Basin Office, Division of Water Pollution Control, 69 W. Washington, Chicago 2, Illinois.
Four sound films available for free showing dealing with the problem of water pollution. Write to your Regional Office.
Federal Security Agency, Office of Education, Washington, D. C.
Better Living Through Wise Use of Resources—Bulletin 15, 1950, $.25.
Conservation Teaching Materials and Aids, 26 p.
Federal Security Agency, Office of Vocational Rehabilitation, Washington 25, D. C.
Brass Tacks, pertinent facts on social and economic aspects of State-Federal system of vocational rehabilitation.
Federal Security Agency, U. S. Public Health Service, Washington, D. C.
Water Pollution Series—free packet of material dealing with pollution problem.
Clean Water in Missouri, $.05.
Large Poster—"Polluted Water Is Almost As Bad As No Water," $.25.
Environment and Health, 152 p.
Nutrition and the Control of Chronic Disease.
U. S. Dept. of Agriculture, Extension Service, Washington, D. C.
List of publications is available.
U. S. Dept. of Agriculture, Forest Service, Washington 25, D. C.
Teacher's Forest Conservation Packet containing booklet, charts, maps, posters and suggestions for teaching.
Know Your Watersheds, 13 p.
Water and Our Forests, 29 p.
Taming Our Forest, 87 p.
You and Forest Fires, 12 p.
Forest Service Film List, 12 p.
Materials to Help Teach Forest Conservation—a bibliography of free films, charts, posters, bulletins and pamphlets, 3 p.
Forest Fire by Smoky—comic type, 16 p.
Ranger 'Rithmetic for 7th grade teachers, 12 p.
U. S. Dept. of Agriculture, Production and Marketing Administration, Washington 25, D. C.
Tomorrow's Food.
Food Marketing and Buying Guides.
A Consumer's Guide to U. S. Standards for Farm Products, 21 p.
List of publications is available.
U. S. Dept. of Agriculture, Soil Conservation Service, Washington 25, D. C., or write to your regional office.
Conquest of the Land through Seven Thousand Years, 38 p.
Use the Land and Save the Soil, 16 p.
Youth Can Help Conserve These Resources, 24 p.
List of Selected Publications for Conservation and Resource-Use Education.
Opportunities for Education in Soil and Water Conservation, 43 p.
Let's Save Soil with Sam and Sue, 28 p.
Our Remaining Land, 12 p.
Our Forests—What They Are and Mean to Us, 38 p.
Outline for Teaching Conservation in Urban Elementary Schools, mimeo., 13 p.
Outline for Teaching Conservation in Rural Elementary Schools, 21 p.
Outline for Teaching Conservation in High Schools, 21 p.
Soil Conservation Activities for Schools, mimeo., 9 p.
Soil Conservation in the School Curriculum.
Early American Soil Conservationists, 64 p.
Conservation in Camping, 26 p.
Soil Conservation—12 issues a year, $1.00.
Our Land and Its Care, 64 p.
Books, Booklets and Bulletins on Soil and Water, 24 p.
Measure of Our Land, 17 p.
The Soil That Went to Town, 20 p.
From the Dust of the Earth, 16 p.
U. S. Dept. of the Interior, Bureau of Indian Affairs, Washington, D. C.
Soil and Moisture Conservation—teacher's bibliography, 28 p.
ABC Book on Soil Conservation, 6 p.
An Outline of a Jingle Contest, Jan. 1950, 10 p.
Conducting Meetings, 34 p.
How to Conduct an Instructional Field Trip Relating to Soil Conservation.
Muddy Waters.
Other materials on conservation available.
U. S. Dept. of the Interior, Bureau of Land Management, Washington 25, D. C.
Land of the Free, 22 p.
Rebuilding the Federal Range—A Resource Conservation and Development Program, 23 p.
Highlights in the History of Public Domain.
U. S. Dept. of the Interior, Bureau of Mines, Information Service, Washington 25, D. C.
Mobilization of Mineral Resources, mimeo., 3 p.
Films available on production and use of minerals.
U. S. Dept. of the Interior, Bureau of Reclamation, Washington 25, D. C.
Dams in the United States—a large chart.
Power—The Columbia Basin Project, 4 p.
Missouri River Basin Project, 18 p.
The Story of the Hoover Dam, 21 p.
Reclamation Era—a publication.
U. S. Dept. of the Interior, Fish and Wildlife Service, Washington 25, D. C., or write to your regional headquarters.
Attracting Birds, 13 p., $.10.
Feeding Wildlife in Winter, 20 p.
Fishes of the Middle West, 44 p.
Old Man of the Pribilofs, 13 p.
254-WL—*Control of Vagrant Domestic Pigeons,* mimeo., 4 p.
320-WL—*Experimental Planting of Food and Cover for Deer.*
224-Wl —*Birds as a Factor in Controlling Insect Depredation,* mimeo., 6 p.
Home for Birds, 24 p., $.10.
Common Birds Useful to Farmer, 28 p.
Fur—An Important Wildlife Crop, 6 p.
Fishery Leaflets, mimeo.
List of publications is available.
List of films available.

U. S. Dept. of the Interior, National Park Service, Washington 25, D. C., or write to regional headquarters.
Booklets on the National Parks.
U. S. Government Printing Office, Superintendent of Documents, Washington, D. C.
Conservation in Camping, $.20.
Clean Water in the Missouri, 8 p., $.05.
Cleaner Water for the Ohio, $.05.
Human Conservation—Story of Our Water Resources, $.20.
Highlights in History of Forest Conservation, 23 p., $.15.
"Polluted Water Is Almost As Bad As No Water"—a chart, 37×48, $.25.
Making Land Produce Useful Wildlife, 28 p., $.15.
WPA—A Story of Human Conservation, 212 p., $.55.
Wood Conservation Bibliography, a selection of references in the field of production and utilization of lumber and other wood products by J. Hugo Kramer, $.40.
Our National Forest, 34 p., $.20.
Prevention and Control of Gullies, 59 p., $.25.
University Publishing Co., 1126 Q St., Lincoln 1, Nebraska.
The Value of Soil Conservation by Alfred W. Phillips, 64 p., $.64, for upper grade and high school teachers—ties in with mathematics.

Utah

Agricultural Experiment Station, Utah State Agricultural College, Logan, Utah.
Lining Canals and Reservoirs to Reduce Water Losses, 24 p.
Intermountain Indian School, Brigham City, Utah.
Soil Conservation Course, 24 p.
Conservation Play, 6 p.
Classroom Activities Relating to Natural Resources, 8 p.
Richard Goes Fishing, 4 p.
Publications on Resource Conservation, 3 p.
Outline of Teaching Units on Soil and Water, 44 p.
Teaching by Means of Surroundings, 12 p.
State Game and Fish Commission, Salt Lake City, Utah.
Send for list of publications.
Veneer Association, 600 S. Michigan Ave., Chicago 5, Illinois.
Veneers—A Modern Art 3500 Years Old.
The Industry and Its Salesman.
Their Manufacture.
Figure in Wood.
And So Plywood, $.05.

Vermont

University of Vermont and State Agricultural College, Agricultural Extension Service, Burlington, Vermont.
B-483—*Erosion on Vermont Permanent Pastures* 1942, 15 p.
B-538—*Sheet Erosion on Two Vermont Types*—1947, 11 p.
William G. Vinal, Professor of Nature Instruction, Cohasset, Massachusetts.
Nature Games, 32 p., $.15.
Nature Dictionary, 17 p., $.15.
Outdoor School Room for Outdoor Living, $1.00.
Bird Calendar, Key and Check List, $.05.
Tree Calendar, Key and Check List.

Virginia

Virginia Agricultural Experiment Station, Blacksburg, Virginia.
Agricultural Research, 112 p.
Virginia Department of Conservation & Development, Richmond 19, Virginia.
Motion Pictures on Virginia Subjects—list.
Pamphlet on the Virginia Dept. of Conservation and Development, 12 p.
Virginia State Dept. of Education, Richmond, Virginia.
Bibliography of Materials on the Conservation of Natural Resources, $.50.
Virginia Soils and Land Use, $1.50.

Washington

State College of Washington, Agricultural Extension Service, Pullman, Washington.
B.B-398—*4-H Soil and Water Conservation in Washington Wheatlands.*
C-131—*Let's Practice Conservation on Pacific Slopes.*
X-492—*Stabilization of Sand Dunes in the Pacific Northwest.*
B-440—*Trees of Washington.*
Dept. of Public Instruction, State of Washington, Olympia, Washington.
Soil Conservation in Washington State, $.50.
Western Forestry Conservation Association, 712 U. S. National Bank Bldg., Portland 4, Oregon.
Permanent Forest Production, 64 p.
Forty Years of Western Forestry, 64 p.
Western Pines Association, Yeon Bldg., Portland 4, Oregon.
Forest Crops Are Growing, 8 p.
Synopsis of free loan films.
Tree Farms of Western Pines.
List is available.

West Virginia

West Virginia University, 230 Park Ave., N. Y. Central Bldg., New York 17, N. Y.
#175—*West Virginia Trees*, 242 p.
#359—*Better Rural Living*, 25 p.
#316-A—*Check List of West Virginia Birds*, 56 p.
Conserving Soil and Water Through Organized Effort, 14 p.
West Virginia Pulp and Paper Co., Covington, Virginia.
Growing and Harvesting Tree Crops, 72 p.
Tomorrow's Trees, 12 p.
Weyerhaeuser Sales Co., P.O. Box 629, Newark, New Jersey.
We Grow Trees, 17 p.
Timber Is a Crop.
Films—"Green Harvest" and "Trees and Homes."
Wilderness Society, 1840 Mintwood Place, N.W., Washington 9, D. C.
The Living Wilderness—publication, $1.00 per year.
List of publications available.
Wild Flower Preservation Society, Inc., 3740 Oliver St., N.W., Washington, D. C.
Wild Flower—publication, $2.00 per year.
Poster—"The Outdoor Code," 2 for $.05.
Common Flowers, 2 p., 10 for $.25.
Wild Flower Protection List.
10 circulars on conservation, $.25.
Wildlife Management Institute, Investment Bldg., Washington 5, D. C.
Outdoors News Bulletin—free monthly publication.
A List of Conservation Teaching Aids, mimeo., 2 p.
Upland Game Management, 80 p., $.21.
Quail and Pheasant Propagation, 72 p., $.13.
The Farmer and Wildlife, 86 p., $.17.
Water Fowl Management on Small Areas, 80 p., $.21.

Wisconsin

Dept. of Conservation, State Office Bldg., Madison 2, Wisconsin.
Report to the People of Wisconsin on Progress in Conservation Education—1952, 66 p.
Wisconsin's Forests—comic type, 10 p.
Wisconsin Mammals, 54 p.

Forest Trees of Wisconsin & How To Know Them, 64 p.
Current and Selected References on Conservation—a bibliography for students and teachers, 20 p.
Wisconsin Conservation Bulletin—monthly bulletin.
Visual Aid Material, 27 p.

Department of Public Education, Madison 2, Wisconsin.
Guide to Conservation Education in Wisconsin Schools, 96 p.
Helps in Planning Conservation Learning Experiences, 57 p.

University of Wisconsin, College of Agriculture, Madison 6, Wisconsin.
Restoring Northern Forests.
Community Forest.
Plants Link Soil and People.
School Forests—a Handbook, 31 p.
Learning to Know Common Wisconsin Trees, 18 p.
Shelterbelts for Windblown Soils.
List is available. Others in process of publication.

Women's Day, Inc., 19 West 44th St., New York 76, N. Y.
Cruickshank Collection of American Birds—4 sheets—colored, $.25.

Wyoming

Wyoming Game and Fish Commission, Cheyenne, Wyoming.
The Amphibians and Reptiles of Wyoming, $.10.
Names of Wyoming Fishes, $.10.
Beaver Management and Ecology in Wyoming, $.25.
Wyoming Wildlife—publication, $.50 per year.

University of Wyoming, Agricultural Experiment Station, Bulletin Dept., Laramie, Wyoming.
Cir. #39—*Water—Life for the Land*—1950, 16 p.

University of Wyoming, College of Education, Laramie, Wyoming.
Instructional Units in Conservation for Elementary School, mimeo., 4 p., $.50.
Organizing and Planning for Effective Education in Soil and Water, mimeo., 23 p.

NEW PUBLICATION SCHEDULE

The experience of the last several years has shown that the publication schedule used in the past will no longer get the issues of ABT out during the first few days of the month of issue, as was the original plan. A new schedule has been worked out which provides a longer time for each of the steps—printing, making up the dummy, correcting page proof, setting up the magazine forms, and so on.

In the future, the manuscripts will be sent to the printer about ten weeks ahead of publication time. That is, manuscripts intended for the May issue will be sent to Lancaster on February 21, those intended for October on July 21, and so on. The May dummy will be made up and sent to Lancaster on March 25, the October dummy on August 25, and so on. The corrected page proof, ready for the printer to run the May issue, will be sent to Lancaster on April 15, the final page proof and so on.

A small amount of space is left vacant when the dummy is made up. This may be used for news items and late releases of various kinds. Such items may be included in the page proof. However, they must be cut to fit the available space exactly, and it is, of course, not possible to see proof of it.

Copy to be sent to the printer with the dummy must be in the editor's hands at least six weeks ahead of the month of issue; short items to be inserted in the page proof must reach the editor by the 8th of the month before the month of issue.

It is hoped that all contributors will cooperate in these earlier deadlines, so that the magazine may always arrive within the first few days of the month.

EDUCATIONAL PACKET

The editor has received from THE GARDEN CLUB OF AMERICA the materials known as "Our Natural Resources Educational Packet," intended for local conservation chairmen. The packet includes pamphlets and folders on various phases of conservation, a study guide and a list of sources. For information, write the Conservation Committee, Garden Club of America, 15 East 58th Street, New York 22, New York.

CONSERVATION IN THE 83RD CONGRESS

The 83rd Congress of the United States convened January 3, 1953, amid the usual fanfare and began organizing itself with the Republicans running the show in both houses. Although the leadership decided to postpone any legislative work until after the inauguration of President Eisenhower January 20, the legislative ambitions of the various members were apparent in the flood of bills poured into the hoppers during the first days. Many of these proposals are private bills, but of the public bills and resolutions, well over 250 affect soils, rivers, public lands, forests, wildlife, parks, minerals or other natural resources.

Two bills of major interest to conservationists were introduced by Congressman Leroy Johnson of

(*Continued on page 53*)

Caracoles at Vinales

Cyril E. Abbott, Agersborg Biological Laboratory, Centralia, Illinois

"Mire Usted, Senor! Es diferente!"

The phrase had been repeated so often that it was difficult to express the enthusiasm the Hispano-American expects of the "Americano." Yet, strangely enough, the expression had a significance I was not to appreciate until weeks later.

The Vinales Valley consists of a great, horizontal, alluvial plain flanked by the Organ Mountains. Scattered over it are *mogotés*—

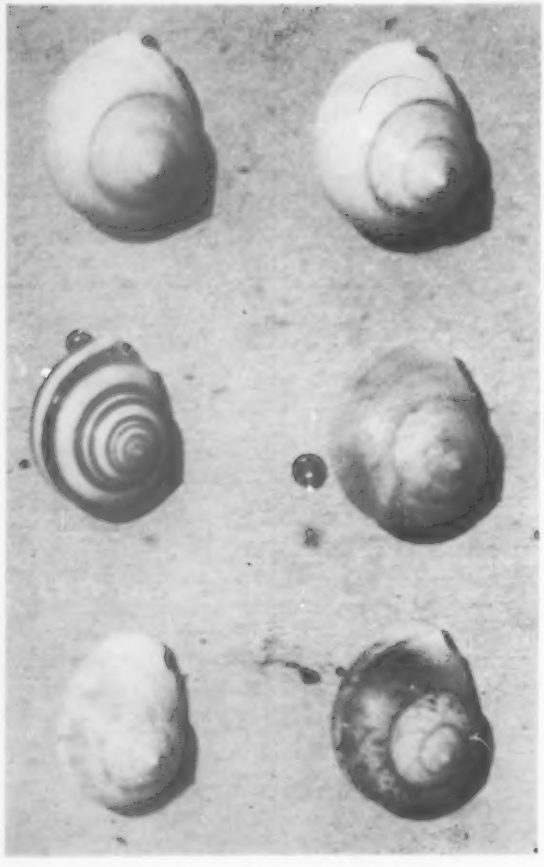
A mogoté near Vinales.

great masses of limestone rising to a height of eight to ten hundred feet. Their perpendicular walls are eroded into tortured ridges, spires, clefts, and nodules, upon which perch many plants. Aeroids, gourds, grasses, cacti, nettles, and even palms cluster so closely upon the sides and rounded summits of the mogotés as to put their surfaces into perpetual shade. Indeed the rock in many places is quite wet. Small streams that rickle down their sides are absorbed in part by the porous stone, which in consequence is covered with a greenish blush of the minute plants upon which snails feed.

Nowhere in the world, perhaps, will one find the variety of land snails that occur in western Cuba. Within an area of four square miles, two hundred and fifty species have been identified. It was not by accident that I had sought this region for my holiday. My time was limited, and I wanted to make the most of it. But for the moment I was more interested in a pair of lizard cuckoos, the presence of which had driven a hen and chicks to cover, than in the fact that my guide had discovered another kind of shell. We had walked westward from one mogoté to another, passing the village with its pastel-tinted houses and orange-flowered flamboyant trees. Across the open side of a rocky recess we came upon a sun-flecked glade in which three black-and-yellow butterflies, tenuous and translucent, engaged in a kind of aerial dance. The ejaculation of my guide referred to more shells of *Chondrothyra incrassa*—white, this time. The others we had found were black or orange, depending upon where they were located.

Varieties of *Chondrothyra incrassa* showing variations in pigmentation of shells.

With the exception of the "tree snails" (Liguus), the "caracoles" are closely bound by invisible ties to the rocks. The term "mogoté" referred originally to an island, and so far as these molluscs are concerned the sea would be no more impassable than the intervening malanga fields, bathed in tropical sun-



Varieties of *Viana regina;* note the banded specimen.

light, where every moving object escapes not the keen eyes of birds and lizards.

In the cases of *Chondrothyra incrassa* and related species of snails, isolation is indubitably linked with coloration of the shells. Chondrothyra is a short, thick, gray snail, with orange tentacles or "horns," and a snout like an elephant. Although the color of the animal itself never varies, that of the shell depends upon location. In each colony the shells are all of one color; just as invariably, those in one colony differ in color from those of other groups. No wonder my guide kept saying: "He alli otro huelgas!" Related snails, such as Chondropoma, exhibit this same kind of variation.

When we include other types of snails, the story becomes more involved. Thus the effects of isolation upon Emoda and Farcimen are partial. In a given place the shells are all of one color but, as the collector passes along the mogoté, he finds pink shells grading into brown and brown into black. The shell of the great, black *Zachrysia guanensis* is the same wherever found—a pale yellow-brown. Similarly, that of the little *Urocoptis vignalensis* is always gray. Yet there is no close ancestral relationship between Zachrysia and Urocoptis.

Viana regina, perhaps the commonest snail in western Cuba, illustrates a still different situation with respect to variation. The shell is porcelainous, translucent, and heavy. At first glance most of the shells appear white, although they are actually tinted in varying degrees with yellow, salmon, or pink. One variety is banded with brown. Otherwise the individual shell is more or less uniform in color. The animal also varies in pigmentation. As all possible variations may be found in a single colony, it is evident that in this species color is not determined by location.

These things I observed at Vinales, but I did not *know* them then. They came to me a little at a time, glimmeringly: While in Florida I watched a Chondrothyra crawl with its double "foot" up a window curtain; in Chicago, as I drew the portrait of a yellow Viana with a purple face; in Salt Lake City, musing upon the intricate color patterns of Liguus.

"Es diferente!" Yes, but what factors account for the ways in which animals are pigmented? Why are the shells of Oleacina, regardless of species and in places as widely separated as Cuba and Peru, always pale brown? Why does the shell, but not the animal, of Chondrothyra vary with location? Why do both the shell and the animal of Viana vary in color, regardless of location?

One may say that the lesson to be drawn from this is obvious. Unfortunately, *the obvious is not always appreciated.* What I learned from all this is that stimulation of the senses alone does not permit us to appreciate relationships immediately. It takes the mind some time to overtake and digest what the eye has seen or the ear has heard. This is true, even of the trained mind, when it is exposed to that which is unfamiliar and novel. How much more evident must it be in the case of the student who encounters, for the first time, an area of knowledge entirely unfamiliar to him!

The General Education Type of Biology Course

Sister Mary Aquin Miller, The Cardinal Stritch College, Milwaukee 7, Wisconsin

For a number of years I have been following with interest articles, symposia, and discussions on the general education type of survey course in biology since we were contemplating the introduction of such a course into our college program. We had devoted much thought and discussion to it before the actual introduction of the course. Because of the diversity of opinion on the value of such a course, pointed out, to a certain extent at least, in a recent article by Dr. Goldsmith (1) and the suggestion of J. A. Trent (2) that a series of articles regarding such courses for college freshmen be forthcoming from various types of colleges, I offer the following observations and explanation of the course as taught at our college. Ours is a girls' liberal arts college, with a small enrollment, which at the present time requires only one section of the course.

That there is much diversity of opinion as to the value of a course of this kind, as well as much discussion with regard to the availability and capabilities of teachers for the same, is evident to anyone following the trend along the line of general education. To have such a course, or not to have it, that is the question. The immediate impetus for its introduction into our college came from the Education Department, whose members felt a need for a course of this kind in the preparation of primary and elementary teachers; other non-science concentrators are also eligible for the course. The request was for a coverage of the physical sciences as well as the biological sciences. The science requirement for the students in question was eight credit hours of a laboratory science. Two points, therefore, were settled at the very beginning of our planning: the course was to include the physical sciences as well as biology, and it was to be a laboratory course (which is, of course, very desirable). The first requisite was met by offering Principles of Physical Sciences during the first semester and Principles of Biological Sciences during the second semester; the second by offering three hours lecture and two hours laboratory weekly, the class meeting one hour daily five times a week. As this indicates, the laboratory periods are one-hour periods. We decided to meet the students every day in order to keep them more continuously in contact with the subject matter and we thought that, with careful planning and preparation, the two one-hour periods would be as profitable as one two-hour period. Our experience has justified this procedure.

As to the teachers, we feel strongly that the best coordination of subject matter is made possible and the best interest of our students served by having the course taught by two teachers—one for the physical sciences and one for biology. This tends to give a well-rounded picture rather than a knowledge of more isolated albeit more detailed facts. Where classes are large and more than one section of the course must be offered, this may present somewhat of a problem. After all, each situation is individual and must be approached from the standpoint of the needs and facilities of the school. This article merely presents our approach with the hope that it may be helpful to others in similar situations.

The choice of subject matter presented a real problem, particularly as it was to be a one-semester course. (As stated above, the first semester is devoted to the physical sciences. Only the biological subject matter will be discussed here.) Many teachers, no doubt, would hesitate to attempt any kind of coverage in this short period. The results, however, while not spectacular, are at least encouraging. A few assumptions are made at the opening of the course, but not many. The semester survey of the physical sciences precedes that of biology and, as the subject matter for the two courses was planned together, it is assumed when the students come to the course in Principles of Biological Sciences they have acquired a knowledge of what is meant by the scientific method and of the elementary facts of physics and chemistry necessary for an understanding of the basic biological principles. The following brief outline will

give some idea of how the subject matter was grouped and what topics were selected for consideration.

The Study of Living Things

1. Interest in living things throughout the ages
   - A. Work of the ancients in establishing biological science
   - B. Biology during the Roman Age
   - C. Biology during the Middle Ages
   - D. Revolutionists and highlights
   - E. The age of microscopic technique and evolutionary ideas
   - F. Biology today

Diversity of Living Things

1. The Plant Kingdom
   - A. The four great divisions
2. The Animal Kingdom
   - A. Usually divided into 13 large groups—phyla

Protoplasm—The Physical Basis of Life

1. Composition of protoplasm
2. The cell
   - A. Component parts
   - B. Cell variations—animal cells; plant cells

Unicellular Organisms

1. Animals—Protozoa
   - A. Amoeba (morphology in detail)
   - B. Other protozoa
2. Plants
   - A. Some unicellular algae
   - B. Some unicellular fungi

Multicellular Organisms

1. Diversity of cells—tissues—organs (examples both plant and animal)
2. Multicellular plants
   - A. Moss—example of simple multicellular plant
   - B. A typical spermatophyte
3. Multicellular animals—Metazoa
   - A. Hydra example of simple multicellular animals
   - B. The vertebrates (fundamental plan)

Food for Living Things

1. Definition of food
2. Kinds of food
3. Function of food
4. Sources of food
   - A. Photosynthesis—energy storing process

Utilization of Food

1. Explanation of diffusion and osmosis
2. Digestion of food
   - A. Definition of digestion
   - B. Digestion in simple organisms like Amoebae
   - C. Digestion in complex organisms like man
     - a. Digestive system and process of digestion
   - D. Digestion as found in plants
3. Absorption and circulation
   - A. In simple organisms like Amoebae
   - B. In complex organisms like man
4. The assimilation of food
5. Respiration—energy-releasing process
   - A. In plants and animals
6. Excretion
   - A. In plants and animals

Response to Environment

1. Irritability—a physiological characteristic of protoplasm
2. Plant tropisms—growth movements
3. Irritability in unicellular organisms as Amoebae
4. Nerve net—hydra
5. Simple nervous system of insects—earthworm
6. Complex nervous system of vertebrates
7. Hormones as related to the organism's response to the environment

Reproduction—Embryology

1. Types of reproduction
2. Reproduction in unicellular organisms (plants and animals)
3. Reproduction in simple Metazoa
4. Reproduction in the vertebrates
5. Seed production in plants

Heredity

1. Structure of cell nucleus
   - A. Mitosis—Meiosis
2. Laws of heredity
3. Human heredity

Interrelations among Organisms

1. Free-living organisms
   - A. Dependence of animals on plants
   - B. Examples of mutual helpfulness
2. Parasitism
   - A. Definition of parasite and host
   - B. Unicelluar parasites—plants and animals
   - C. Parasitic worms
   - D. Parasitic fungi

Plant and Animal Ecology

1. Ecological types of plants
2. Vegetation areas and plant associations—plant succession

3. Animal habitats
4. Laws of distribution
5. Expansion and repression factors

Evolution

1. Various theories of evolution
2. Evidence for evolution

Laboratory exercises were worked out to correlate with the topics under discussion. While demonstration set-ups were freely used and a moderate use was made of films, emphasis was on individual laboratory work. This latter was of greatest interest to the students and no doubt to their greatest advantage.

Although limited in time and scope, from the evidence available it seems that the students have obtained an overall view and the basic underlying biological principles from the course here presented. For non-science concentrators it serves to give an informational and cultural background. It is by no means perfect. In fact I am conscious that adverse criticisms could be given at many points. It has, nevertheless, filled a definite need for us. Undoubtedly there will always be diversity of opinion as to the value of courses of this type but, if you are interested in "wide fields," if your program does not include a course of this kind and the non-science concentrators are looking for one, if you wish to broaden your view of biology, try working out a syllabus with the peculiar needs and demands of your own campus in mind.

(1) Goldsmith, William M., Ph.D. 1952. Survey Course in Biology, *Turtox News*, 30: 66–69, 80–81.

(2) Trent, J. A. 1952. Letters, *The American Biology Teacher*, 14: 75–76.

Trees Along the Nature Trail at Roosevelt High School is the title of an interesting little booklet that came to the editor's desk recently. It is the fourth of a series of bulletins published by the Biology Club, sponsored by S. M. Pattee, of Roosevelt High School, Cedar Rapids, Iowa. The booklets represent a great deal of constructive work, are attractively printed and bound, and are useful to both pupils and residents of the community. For information, write S. M. Pattee, Roosevelt High School, Cedar Rapids, Iowa.

CONSERVATION IN THE 83RD CONGRESS

(*Continued from page 48*)

California. One (H. R. 1037) would establish the Green River Canyons National Park from a portion of Dinosaur National Monument in Colorado and Utah. This is the area in which the controversial Split Mountain and Echo Park dams have been proposed by reclamation interests. The other (H. R. 1038) is a repeater from last session; it would prohibit dams or other big water-engineering projects within or affecting any national park or monument.

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Biology in the News

More Food for Less Work, *Life*, Jan. 5, 1953, pp. 62–73.

Pictures and charts which portray some of the many advances which we have made in agriculture during the past 75 years. You will want copies of this for your files.

Boys Will Be Men by F. L. Waugh, *Outdoor Life*, Jan. 1953, pp. 40–41 & 66–68.

An inspiring account of the conservation practices established by the Fort Morgan Junior Conservation Club under the leadership of the local sports club.

A New 300-Million-Year-Old Clue to Evolution, *Life*, Jan. 19, 1953, pp. 82–84.

Pictures and a short writeup of a type of fish long considered existent only as a fossil. You will want the pictures of this remarkable fish for your permanent files.

Polio Is Being Defeated by Marguerite Clark, *McCalls*, Jan. 1953, pp. 48 & 107–111.

Scientists think it is possible to secure a more lasting immunity to polio than that conferred by gamma globulin. This article recounts some of the problems faced by the men who are striving to prepare a safe vaccine which will make us immune to the three known types of polio.

What to Do Until the Doctor Comes by D. B. Armstrong, M.D., *American Mag.*, Jan. 1953, pp. 98–102.

The basic principles of first aid and the easily observed symptoms of common diseases are clearly stated. This article should be readily available to all the students. It gives the specific information necessary to care for the common emergencies.

Danger Signals in Your Life by Dr. Walter C. Alvarez, *Cosmopolitan*, Jan. 1953, pp. 78–91.

A compendium of information about an extensive list of human ills. The real danger signals are pointed out. A glossary of terms used is included.

A New Treatment for Kidney Stones by John Gilmore and Eric Northrup, *Sat. Ev. Post*, Jan. 17, 1953, pp. 30–31 & 88–92.

Kidney stones plague many persons. Hyaluronidase is not a wonder drug which cures the disease but it is being used to ease the pain and possibly to prevent complications in those suffering from this ailment.

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